C & C ASSOCIATES

troubleshooting guides

SERVICING THE CANON T90

I. CIRCUIT DESCRIPTION

Power Circuit

Battery. Batteries are four AA alkaline or Ni-Cd held in a magazine, V-Bat six volts. Battery power passes directly to DC / DC convertor, **MD FPC** , **Main FPC** and magnets **MG-1**, **MG-2**.

Standby. With main batteries inserted B+ passes to pin 23, **IC-3** through diode **D-3** providing 5.5 volts **VDD**. With batteries removed reset switch **SW-3** grounds pin 3, **IC-3**. One 3 volt lithium battery **B-2** provides standby power through diodes **D-3**, **D-1** and capacitor **C-6**. Capacitor **C-6** is **VDD** to pin 23, **IC-3** and **VSS** pin 59, **IC-3**.

Main Switch. Moving switch **SW-16** to 'A' grounds pin 22, **IC-3**; DC / DC turns on for two seconds.

Pre-Release. Closing switch **SW-1** or exposure preview switch **SW-1'** grounds pin 7, **IC-3**. Pin 36, IC-3 switches low to turn on DC/DC convertor. DC/DC sends 6 volts for **E-1**, **E-2** and 15 volts **VPP**. **E-1** powers circuits through diode **D-5**. **E-2** powers lightmeter through coil **L-1**. **VPP** powers shutter.

Display. LCD is off with main switch on 'L'. LCD turns on with main switch on 'A'. Finder LED's turn on when release is depressed 1/2 stroke. LCD displays **bc** and three bars for new batteries.

Battery Check. At 4.25 volts camera will release but mirror doesn't return, below 3.25 volts camera will not release. Battery check button grounds pin 4, **IC-3** through switch **SW-4**. **V-Bat** is compared to **R-Bat** voltage by pin 3, **IC-4**. External battery check uses rewind motor as load, internal battery check uses charge motor.

Logic Check. Switches **SW-16**, **SW-12** must be closed and switches **SW-3**, **SW-13** open or no functions. Cycle switch **SW-3** to reset camera. Finder LED will not light if finder switch is set to '**O**'.

Notes: Standby battery lives on prism right. Reset switch **SW-3** lives in battery chamber. DC/DC lives bottom right. Switch **SW-1** connects to pin 7, **IC-3** through diode **D-9**. Switch **SW-1'** lives at top back right. Switch SW-13 lives on mirror box, bottom left. See Schematics for wires, paths.

Control Dial

Rotating control dial on hand grip sends control adjustment pulses to **IC-6** through switches **SW-25**, **SW-26**.

Lightmeter

DC / DC convertor **E-2** output powers **IC-1** and **IC-2** for metering. **IC-3** calculates exposure based on light, DX / ISO, lens speed, F stop, shutter speed, exposure compensation and metering mode.

Light. **IC-4** reads light through **IC-1** on **Main FPC** or **IC-2** on **SP FPC**. **IC-1** used for average and partial readings lives above eye piece. **IC-2** used for spot and flash TTL lives under mirror box and reads light through sub-mirror. **IC-4** sends light information to **IC-5**.

DX / ISO. **IC-8** reads DX pins **SW-43** through **D Flex** connected to **Main FPC** and sends it to **IC-5**. DX is read at the start of film advance, default is last DX / ISO. Pressing ISO button grounds pin 12, **IC-3** through switch **SW-8** allowing manual ISO selection. Light added to ISO equals Ev / Program.

Lens Speed. **IC-5** reads lens speed through Avo switches **SW-33**, **SW-34**, **SW-35**, **SW-36**. Installing lens sets Avo pin depth, closing switch equaling Avo.

F / Stop. In Av / aperture priority mode, F / Stop is selected through Command Dial. F / Stop subtracted from Ev equals auto shutter speed.

Shutter Speed. In Tv / shutter priority modes, shutter speed is selected through Command Dial. Shutter speed subtracted from Ev equals auto aperture.

Exposure Compensation. Pressing Exposure compensation button grounds pin 13, **IC-3** through switch **SW-9**, compensation is selected through Command Dial.

AE Lock. Exposure reading is locked as long as release is depressed 1/2 stroke.

Metering Mode. Depressing metering mode button grounds pin 9, **IC-3** through switch **SW-6**. Selecting center-weighted average, partial or spot metering is through Control Dial.

One point spot. While in spot metering mode depressing point spot button grounds pin 10, **IC-3** through switch **SW-7**, exposure is memorized for 30 seconds. Selecting two or more spots averages exposure. Depressing highlight button grounds pin 37, **IC-5** through switch **SW-29** increasing high spot exposure, depressing shadow

button grounds pin 38, **IC-5** through switch **SW-30** decreasing low spot exposure.

Stop down. Setting lens to manual grounds pin 24, **IC-3**, LCD displays Moving depth of field preview slide grounds pin 27, **IC-3** through switch **SW-20** selecting stop down metering mode.

Display. LCD displays ISO speed during first frame advance and when ISO button is pressed. LCD displays meter mode icon. Finder displays lightmeter information. Selecting spot metering turns on finder LCD, depressing one point spot button fixes reference.

In stop down metering LCD displays aperture icon. In 'Av', 'P' or 'Program' modes / lens in manual finder displays shutter speed. In 'Tv' mode / lens in manual finder displays either '**OP**' / open aperture, 'OO' / correct exposure or '**CL**' / close aperture.

Logic. If DX is not recognized LCD ISO number blinks. If lens in on 'A' when when lens is stopped down, LCD displays '**EEE**', finder '**Help**' no release.

Notes: One point spot button is near release, highlight and shadow buttons live at top back right. Using linear polarization filter will cause incorrect lightmeter readings. See Schematics for wires, paths.

Release

Before release. Shutter is latched mechanically in charged position, diaphragm stop down lever / mirror is held by **MG-2**.

Mirror Up. Depressing release button fully or shorting three remote contacts closes switches **SW-1, SW-2.** Switch **SW-2** grounds pin 5, **IC-3** through diode **D-8.** Finder display turns off; pin 52, **IC-4** pulses low activating hybrid magnet **MG-2.** MG-2 releases diaphragm stop down lever which frees mirror control levers at the end of its travel. With mirror up switch **SW-13** opens disconnecting pin 19, **IC-3** ground; 1st curtain is released.

Mirror Down. When 2nd curtain completes its travel switch SW-19 opens disconnecting pin 26, **IC-3** from ground. Depending on 'H' or 'L' drive mode, **IC-10** controls charge motor **M-2** through transistors **Q-7, Q-8, Q-9, Q-10.** As charge cam rotates switch **SW-15** sends pulses to pin 21, **IC-3** and pin 41, **IC-5** through diode **D-12, 13.** When mirror, aperture lever and shutter are reset; charge complete switches **SW-14** and **SW-15** closes, motor **M-2** turns off. Switch SW-14 grounds pin 20, **IC-3** and pin 40, **IC-5** through diode **D-10,11.** Switch **SW-15** grounds pin 21, **IC-3** and pin 41, **IC-5** through diode **D-12,13.**

Charge Motor Control. Pressing drive mode button selects 'Single', 'H' or 'L'. In 'L' drive mode, **IC-10** switches pin 3 low, pin 1 high to turn on transistors **Q-8** and **Q-9.** This applies B- to right motor contact and B+ to left contact. In 'Single' and 'H' drive mode, **IC-10** switches pin 2 low, pin 4 high to turn on transistors **Q-7** and **Q-10** switching motor polarity. Motor **M-2** direction shifts planetary gears which controls 'H' / 'L' speed and keeps charge cam rotating in one direction.

Logic. Charge switches **SW-13, SW-14,** shutter switches **SW-18, SW-19** and with lens set to 'A' AE charge switch **SW-12** must start closed, LCD displays '**EEE**', finder '**Help**'. While charge motor **M-2** is running pulses generated by switch **SW-15** are counted by pin 41, **IC-5** through **D-12, 13.** If pulses are slow, drive may shift from 'H' to 'L' and/or and LCD display blinking **bc.** No operations in '**EEE**','**Help**' or blinking **bc.**

Notes. Motor **M-2** lives in handgrip. Magnet MG-2 and AE charge switch **SW-12** live on mirror box right. Charge switches **SW-13, SW-14** live bottom left. Shutter switches **SW-18, SW-19** live in shutter unit. See Schematics for wires, paths.

Shutter

Before Release. Shutter starts in charged position, held mechanically by latches in shutter unit. During prerelease 15 volts **VPP** travels to shutter magnets **MG-3, MG-4** and capacitors **C-19, C-20** through diode **D-14, 15.**

First frame advance. Shutter remains closed.

Exposure. With mirror up switch **SW-13** opens disconnecting pin 19, **IC-3** ground. Pin 55, **IC-4** releases 1st curtain by pulsing high which momentarily turns on transistor **Q-1** giving capacitor **C-20** a discharge path through hybrid magnet **MG-3.** At end 1st curtains travel switch **SW-18** opens disconnecting pin 25, **IC-3** from ground. This checks curtain movement.

After 1st curtain release **IC-3** counts shutter speed then pin 54, **IC-4** releases 2nd curtain by pulsing high which momentarily turns on transistor **Q-2** giving capacitor **C-19** a discharge path through hybrid magnet **MG-4.** When 2nd curtain completes its travel switch **SW-19** opens disconnecting pin 26, **IC-3** from ground. This checks curtain movement and starts charge motor **M-2** returning mirror.

Display. LCD, finder displays shutter speed. In 'B' LCD displays seconds.

Logic. Shutter switches **SW-18, SW-19** must start closed or LCD displays '**EEE**', finder '**Help**'. Curtains must complete their travel and open switches **SW-18** and **SW-19** or after exposure cycle is complete LCD displays '**EEE**', finder '**Help**'; charge motor **M-2** cycles once trying to reset camera. No operations in '**EEE**','**Help**'

Notes. Magnets **MG-3, MG-4,** capacitors **C-19, C-20,** diode **D-14,15,** shutter switches **SW-18, SW-19** live in shutter unit. See Schematics for wires, paths.

Aperture

Manual. Aperture is selected through lens. During release stop down lever moves aperture to selected stop, auto aperture control lever has full travel because aperture magnet **MG-1** is turned on before stop down lever release and kept on during aperture stop down.

In Av mode lens is set to 'A', aperture selection is made using control dial and auto system.

Auto. Auto aperture control levers starting position closes AE charge switch SW-12 grounding pin 17, **IC-3**. Setting lens to 'A' depresses auto pin on lens mount. This opens auto / manual switch **SW-17** disconnecting pin 24, **IC-3** from ground.

During release magnet MG-1 turns on before stop down lever is released. As auto lever in lens pulls auto aperture control lever in body down; pin 45, **IC-3** counts pulses generated by Av code switch **SW-24**. At Av number pin 51, **IC-3** switches high turning off magnet **MG-1.** This ends auto aperture control lever / aperture movement.

Display. LCD displays M in manual.

Logic. LCD displays '**EEE**', finder '**Help**' if switch **SW-12** is not closed when lens is set to 'A'.

Notes. Auto aperture control lever is held mechanically before release. Switch **SW-17** lives on mirror box left. Magnet **MG-1**, switches **SW-12** and **SW-24** live on mirror box right. See Schematics for wires, paths.

Film Transport

Loading. Closing film door opens switch **SW-22** which disconnects pin 28, **IC-3** from ground. With film cassette inserted pressure against DX exposure pad opens cassette switch **SW-21** disconnecting pin 28, **IC-3** from ground. **IC-10** switches pin 7 low, pin 8 high to turn on transistors **Q-3** and **Q-6**. This applies B+ to red motor **M-1** wire and B- to black wire. The wind gears engage sprocket for direct drive. The sprocket cycles film winding switch **SW-31** generating pulses to pin 43, **IC-3**. At the completion of each wind stroke switch **SW-27** grounds pin 88, **IC-6**. At end of film loading; sprocket becomes free wheeling, motor **M-1** reverses direction briefly to check engagement by cycling sprocket / switch **SW-31** through film. In reverse wind, **IC-10** switches pin 7 low, pin 5 high to turn on transistors **Q-4** and **Q-5**.

Advance. Each release repeats cycle with one exception, reverse wind is used only for loading.

Rewind. **IC-8** reads frame numbers from DX pins 6, 7. When exposure count equal frame number rewind begins. **IC-9** switches pin 6 low, pin 8 high to turn on transistors **Q-11** and **Q-14**. This applies B+ to pink motor **M-3** wire and B- to blue wire. Rewind gears engage rewind fork. Rewind ends shortly after switch **SW-31** stops cycling, motor **M-3** briefly reverses direction to reset gears away from rewind fork. In reset, **IC-9** switches pin 7 low, pin 5 high to turn on transistors **Q-12** and **Q-13**.

If frame numbers is not read through DX failure of both switches **SW-27** and **SW-31** signals rewind. Manual rewind is possible after frame #1. Manual rewind button **SW-11** grounds pin 16, **IC-3** through front left connector.

Display. LCD displays cassette icon when cassette switch **SW-21** opens, moving bars as film moves, exposure number, blinking cassette icon at end of rewind. If frame number is read from DX, finder LCD displays '**F**' then counts down last nine frames.

Logic. Film door switch **SW-22** and cassette sensing switch **SW-21** must be open or no film loading. Switches **SW-31** and switch **SW-27** must cycle or film will continue winding. If switch **SW-27** and **SW-31** fails to cycle LCD three bars blink, no functions. After rewind LCD displays blinking cassette icon, no functions until film door cycles.

Notes: Sprocket free wheels until film motor starts, at the end of each wind stroke. Wind motor **M-1** lives in spool. Transport gears live bottom left. Rewind motor **M-3** lives front right. Rewind gears live above rewind fork.

Flash

Flash shoe has five contracts; Synch, STSP, AVEF, VC / CCC and FEID. Trail curtain synch can be selected through flash. In flash mode program ranges between 1/60 and 1/250, manual 1/250 and slower. 300 TL flash must be used for TTL and FE-TTL.

Synch. **SW-X** grounds contact when 1st curtain completes its travel triggering flash.

AVEF. Flash sends aperture voltage to pin 2, **IC-4**. Aperture is selected using auto aperture circuit.

STSP. **IC-4** read flash output through **IC-2**. At integration reference voltage pin 59, **IC-4** sends TTL stop pulse. 300 TL flash must be used.

VC / CCC. Lead curtain closes switch **SW-X** turning on transistor **Q-32**. This turns on trigger triac on **Flash Trigger PCB**. Triac grounds PC and hot shoe X contact.

FEID. Pin 60, **IC-4** sends pre-flash trigger signal when flash is set to FE-TTL mode and spot metering button is used. Pre-flash fires, exposure is memorized.

Display. Finder LCD displays exposure of main subject in FEID mode.

Notes. **IC-2** lives on bottom of mirror box.

Self-Timer

Pressing button in right side panel grounds pin 30, IC-3 through switch **SW-23**, front left connector.

Finder Control

Switch left grounds pin 25, **IC-5** through switch **SW-28**, front left connector. **IC-5** tells **IC-8** to turn on LCD and finder light. Switch left and centered pin 58, **IC-5** is disconnected from ground, finder LEDs turn on. Switch right; pin 58, **IC-5** grounds through **SW-32**, front left connector.

Double Exposure

Depressing both exposure mode and meter mode buttons grounds pins 8, 9, **IC-3**. LCD displays 'ME', exposure counter changes to 1. 1 through 9 multi-exposure are selectable through control dial.

Safety Shift

Depressing both ISO and exposure compensation buttons grounds pins 12, 13, **IC-3**. LCD displays 'SS'. Manual speeds are overiden if incorrect.

II. TOOLS AND INFORMATION

A. Tool and Equipment

- Anti-static workmat or strap
- Two 1000 probes
- 3K probe
- DVM
- Oscilloscope
- DC power supply
- Current meter or ZTS Interface
- 0.4 resistor in series with power supply. Current meter or ZTS Interface can substitute.
- Test cassette with DX
- Grounded soldering iron
- Canon 50mm F1.4 Test Lens

B. Service Notes

1. Cycle reset switch in battery chamber or SW-3 solder point to reset camera.
2. In Troubleshooting * Indicates most common problem.
3. Curtain travel times can be adjusted w/o re moving mirror box.
4. Using linear polarization filter will cause in correct lightmeter readings.
5. IC-Reset isn't found on all models.
6. Shutter is no longer available but Canon will rebuild if shutter is sent to them.
7. Check strap lugs for loosness.

C. Battery

Main Battery	4 AA alkaline or Ni-Cd
Battery voltage	6 volts
Standby Battery	3 volt Lithium
Mirror Won't return	4.25 volts
No Release	3 volts

D. Typical Operating Currents

Off	100µA or less
ON	100µA or less
Pre-Release	150mA
Bulb	65ma then 1ma
Film Transport	1450 mA
Rewind	450 mA peak

E. Coil Resistances

M-1, Film Transport	3.5
M-2, Charge	1.7
M-3, Rewind	3.7
M-1, Auto Aperture	327
MG-2, Release	67
MG-3, 1st Curtain	18
MG-4, Release	18

F. Lens Flange Focal Distance

44.14mm ±0.02mm	To Pressure Plate Rail
±0.02mm	Parallelism

G. Film Leader

Bridge film leader solder lands prism left to leave leader out after rewind.

H. Adjustments

Battery Check

Adjust R-Bat in pre-release until voltage is 3.6 volts.

Shutter

Curtain Travel	2.7ms
1st Curtain Adjust	Access Bottom
2nd Curtain Adjust	Access Top Right, 3rd layer
1/4000 (294µs)	**VR-8**, front left
K factor	12.5

X Synch

X-Synch Delay, front left 3rd layer.

Lightmeter

*AE SPDs

* Skip if IC-1 and IC-2 have not been changed.

1. Mask Light Box with 12mm hole in center
2. Select Program
3. Set lens to F/5.6, closest focus, stop down lens.
4. Position lens square to light box, hole in fo cus.

IC-1 Average, Partial SPD

1. Adjust eccentrics right of IC-1 so light source spot is within outer micro prism circle

IC-2 Spot SPD centering

1. Read Shutter speed.
2. Move camera vertically, compare off center readings. Should be ± 1 Ev.
3. Adjust sub-mirror eccentric, shutter open on 'B'.

Set Adjustment Mode

1. Desolder Solder Bridge A, top left
2. Solder jumper between Test Land A (top left) and Test Land B, E-1 (prism left, 2nd layer).

3. Replace top cover, depress release 1/2 stroke.
4. Ground Test C (bottom Command Back Con tact near spool) until F/ Stop LEDs display correct number. One number change each time Test C is grounded.
5. **Finder LEDs:**
   1. **F/Stop LEDs = meter mode**
      03 = spot , 02 = partial , 01 = Average
   2. Shutter Speed LEDs = AR-1 and AR-2. **AR-1** = Right 2 digits, **AR-2** = Left 2 dig its

Adjust

Spot
1. Set finder F/Stop LED for '03'.
2. Adjust **VR-2** until AR1 LEDs read **'d2'** at Ev 12.

Partial
1. Set F/ Stop LEDs, display '02'.
2. Adjust **VR-3** until AR1 LEDs?? read **'d0' at** Ev 12.

Average
1. Ground Test C (bottom Command Back Con tact) until F/ Stop LEDs display '01'.
2. Adjust **VR-4** until AR1 LEDs read **'CE'** at Ev 12.

Gain
1. Set F/ Stop LEDs display '02'.
2. Adjust **VR-1** until AR2 LEDs?? read **'68'** at Ev 6.

Aperture
1. Set Av mode, F/5.6.
2. Measure with shutter tester.
3. A-1, A-2, B-, A-3 lands, top prism left.

Adjust

Normal = A-1, A-2, B- solder bridged.
+ 1/8 = A-2, B- solder bridged.
+ 2/8 = A-3, B- solder bridged.
- 1/8 = A-1, B- solder bridged.
- 2/8 = A-1, A-3, B- solder bridged.
- 3/8 = A-1, A-2, B- solder bridged.
- 4/8 = A-1, A-2, A-3, B- solder bridged.

Flash

Aperture Selection
1. Ground VC / CCC contact through 3KΩ.
2. Connect VC / CCC to AVEF contact.
3. Check finder for F/4.
4. Adjust **VR-5**, front left.

TTL Stop
1. Use 300 TL flash.
2. Test against 18% gray card, 2 meters.
3. Adjust **VR-7**, front left. ±0.5 Ev.

FEL Exposure:
1. Use 300 TL flash, FEL mode, 35mm position.
2. Test against 18% gray card, 2 meters.
3. Set 1/250, F/5.6, ISO100, stop down mode.
4. Push spot meter button for pre-flash.
3. Adjust **VR-6**, front left. ±0.5 Ev.

III. DISASSEMBLY AND REASSEMBLY

Front Apron: 3 screws; 1 top, 2 bottom. Loosen 2 film door latch screws, right.

Top Cover: 2 screw, front. 1 screw top right, above strap lug. 2 screws, back near eye piece. Unsolder 9 top cover wires from FPC, Bk, W, Pk, Bl, Pu, Gn, Or, Gr, flash shield cable/wh. 2 buttons, rewind.

Bottom Battery Chamber: Rubber cover. 2 screws under brass cover plates, long screw front. 2 screws far right, silver screw front. 2 bk. screws far left. Retaining ring around tripod scocket. Lift bottom of hand grip rubber, remove battery chamber. **Note** : small compression spring near hand grip. Unsolder 6 wires; Bk, Bl, Gn, Rd, Bk, Y.

IC-3 Access: Top Right, under LCD. Remove front apron, top cover. Lift LCD, 3 screws (silver screw, back right).

Release Magnet Access: Remove front apron. Use 45° pick and syringe to clean magnet.
Note : Magnet Shield is open on bottom.

DX FPC Access: Top Left, under Main FPC. Remove front apron, top cover. Desolder Film Door switch. 2 screws.

Shutter FPC Access: Remove front apron, top cover. Front left connector, 2 screws. Lift top 2 FPCs. Plastic plate, 2 screws.

Transport Motor Wires Access: Remove front apron, top cover. Front left connector, 2 screws. Lift top 2 FPCs. Plastic plate, 2 screws.

Release Switch Block: Unsolder 6 wires bottom left; Bk, R, Pk, Y, W, Bl. Remove hand grip rubber, tape. 3 screws, top of handgrip. Lift release unit from top.

Rewind Motor: Remove Covers. 2 screws.

Charge Gears: **Bottom** : Unsolder most wires from bottom. Remove plate, DC/DC, 2 screws each. Remove shutter charge lever #1 (loose bushing), mirror charge lever, charge cam/gear. Remove charge plate; 4 screws (not switch plate screws, 2 plastic thread screws at lower left and upper right. **Note** : Loose spring under plate. Remove spring, gears. **Note** : Position of clutch spring under gear.
Reassembly Tips : Rotate charge gears or cam to check shutter / mirror charge levers; shutter should charge.

Remove **Release Switch Block .**

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Right Side Panel Switch Plate: Film door, clip. Door hinge, 2 screws. Plate, 2 screws, disengage panel door spring.

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Handgrip: Remove Release Switch Block, Right Side Panel Switch Plate. 2 Bk screws top, 1 Bk screw bottom.

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Charge Motor , Gears: Remove Release Switch Block, Right Side Panel Switch Plate, Handgrip. Desolder 2 top connections. Motor, 2 screws. **Note** : access 1 screw through access hole.

Film Advance Motor, Gears:
Front Left: Unsolder R, Gr Self-LED wires. Mirror Box ground Gr wire, 1 screw. Unsolder 6 wires; Bk, Bk, Bl, W, Y, R. Desolder V-Bat pin. FPC Connector, 2 screws. Separate top two FPCs, SP FPC, Main FPC **Note:** FPC pads.
Top Righ t: LCD, 3 screws (silver screw, back right); unsolder Bk, R LCD wires from Main FPC; unfold LCD; unsolder 3 sprocket wires, Y, Bk, Lt. Bl near Clk. Lift FPC unsolder R, Bk motor wires.
Remove Release Switch Block, Right Side Panel Switch Plate, Handgrip. Desolder Data Contacts. Remove Charge Motor (don't desolder), gears.
Bottom : Unsolder Or, Bk, Gn, SW-14, SW-15 wires. Remove 2 FPC screws, spacer. Fold back MD FPC. Remove plate, 2 screws. Remove shutter charge lever #1 (loose bushing), mirror charge lever, charge cam/gear. Remove charge plate; 4 screws (not switch plate screws, 2 plastic thread screws at lower left and upper right. **Note** : Loose spring under plate. Remove spring, gears. **Note** : Position of clutch spring under gear. Top: Remove sprocket shaft screw. Remove Transport plate, motor. Unscrew motor.
Reassembly Tips : Rotate charge gears or cam to check shutter / mirror charge levers; shutter should charge.

MD FPC:
Front Left: Unsolder R, Gr Self-LED wires. Mirror Box ground Gr wire, 1 screw. Unsolder 6 wires; Bk, Bk, Bl, W, Y, R. Desolder V-Bat pin. FPC Connector, 2 screws. Seperate FPCs. **Note** : FPC pads.
Top Righ t: LCD, 3 screws (silver screw, back right); unsolder Bk, R LCD wires from Main FPC; unfold LCD; unsolder 3 sprocket wires, Y, Bk, Lt. Bl near Clk. Lift FPC unsolder R, Bk motor wires.
Remove Release Switch Block, Right Side Panel Switch Plate, Handgrip. Desolder Data Contacts. Remove Charge Motor, gears.
Bottom : Unsolder all wires from MD FPC. Remove 2 FPC screws, spacer. Desolder DC / DC.

Removing Mirror Box.

Remove Covers.

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Top Left: Unsolder 8 wires; Gr, Lt. Bl, Or, W, Y, Gn, Bn, Pk. 2 screws. Desolder Film Door Switch. Remove plastic plate. Unsolder DX FPC from FD FPC. Desolder film door switch from FD FPC.

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Top Center: Eye piece; 2 vertical screws left & right of AE SPD. **Note** : Left screw remains with eye piece.

Top Right: LCD, 3 screws (silver screw, back right). Unsolder Bk, R LCD wires from Main FPC. Unfold LCD Unsolder 3 sprocket wires, Y, Bk, Lt. Bl near Clk.

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Continued

Continued

Prism Right: Desolder Shutter FPC from Main FPC. **Note:** Main FPC has pins which sit into holes in Shutter FPC.

Front Left: Unsolder R, Gr Self-LED wires. Mirror Box ground Gr wire, 1 screw. Unsolder 6 wires; Bk, Bk, Bl, W, Y, R Desolder V-Bat pin. FPC Connector, 2 screws. Seperate top two FPCs, SP FPC, Main FPC **Note:** FPC Pads

Bottom: Center. Remove stop down spring, bottom spring.

Mirror Box Screws: 2 screws, left & right of eye piece. 2 screws, bottom center of mirror box.

Reassembly Tips: Check engagement of stop down lever, depth of field slide. Remember: stop down spring, Bk & Gr wire from Shutter FPC. **Shutter cocked.**

Mirror Box Removed

Shutter: Remove Mirror Box. Unsolder R, Bk wires near V-Bat. Plastic plate, 2 screws. Unsolder Or wire from shutter unit. 3 screws; 2 top left & right, 1 bottom left. **Note :** Shutter is sealed to body, reapply seal.

IV. SWITCH CHART

Power

Symbol	Function	Location / Wires	Symptoms of Malfunction
SW - 16	On / Off	Bottom Center White, Black Wires	**Shorted:** Won't turn off. **Open:** No functions.
SW - 1	Pre - release	Handgrip White, Black Wires	**Shorted:** Finder display stays on. **Open:** No functions.
SW - 1′	Exposure Preview	Top Right Back White, Black Wires	**Shorted:** Finder display stays on. **Open:** No Exposure Preview
SW - 3	Reset	Battery Chamber Yellow Wire	**Shorted:** On functions. **Open:** No reset.
SW - 4	Battery Check	Right Side Panel Front Left Connector	**Shorted:** Only Battery Check function. **Open:** No Battery Check.

Control Dial

SW - 25 SW - 26	Control Modes	Hand Grip Yellow, Pink, Black Wires	**Shorted or Open:** No Control of Modes.

Light Meter

SW - 6	Meter Mode	Top Left	**Open:** No Meter Mode Change.
SW - 7	Spot Meter	Handgrip Red Wire	**Shorted:** Always Spot Meter. **Open:** No Spot Meter.
SW - 9	Exposure Compensation	Bottom Brown Wire	**Shorted:** Stays in Compensation. **Open:** No Compensation.

IV. SWITCH CHART (continued)

Light Meter (continued)

Symbol	Function	Location / Wires	Symptoms of Malfunction
SW - 20	Stop Down Metering	Front Right Bottom White Wire	**Shorted:** Stop Down Meetering only. **Open:** No Stop Down Metering.
SW - 28	LCD, Finder Illumination	Right Side Panel Front Left Connector	**Open:** No Illumination.
SW - 29	Highlight Control for Spot	Top Right Back Blue, Black Wires	**Shorted or Open:** No Highlight Function.
SW - 30	Shadow Control for Spot	Top Right Back Pink, Black Wires	**Shorted or Open:** No Shadow Function.
SW - 32	Finder LED Control	Right Side Panel Front Left Connector	**Shorted:** Finder LEDs OFF. **Open:** Fincder LEDs won't turn off.
SW - 33, 34, 35, 36	AVO Input	Front Right Bottom Yellow, Brown, Red, Gray Wires	**Shorted or Open:** Metering, Av Mode Problems.
SW - 37, 38 39, 40, 41, 42, 43	DX	Film Chamber	**Shorted or Open:** Metering or Rewind Promblems.

Release

SW - 2	Release	Hand grip Blue Wire	**Shorted:** Continuous Release. **Open:** No Release.
SW - 13	Checks Mirror Position	Mirror Box Left Front Left Connector	**Shorted:** Shutter doesn't release, mirror stays up. **Open:** No functions.
SW - 14	Charge Completion Check	Bottom Left Orange Wire	**Shorted or Open:** Charge motor runs on after mirror return.
SW - 15	Check Speed of Charge	Bottom Left Green Wire	**Shorted or Open:** Charge motor runs on after mirror return, possibly LCD displays **bc**.

Shutter

SW - 18	Checks 1st Curtain Movement	Shutter Unit Front Left Connector	**Shorted or Open:** 'EEE'.
SW - 19	Checks 2nd Curtain Movement	Shutter Unit Front Left Connector	**Shorted or Open:** 'EEE'.

Aperture

SW - 24	Av Code Switch	Mirror Box Right Purple Wire	**Shorted or Open:** Lens stops down completely in auto.
SW - 12	AE Charge Switch	Front Right, Bottom White Wire	**Open:** 'EEE' with lens in 'A'.
SW - 17	Auto Aperture	Lens Flange Leftt Front Left Connector	**Shorted:** Manual Aperture only. **Open:** Auto Aperture only.

IV. SWITCH CHART (continued)

Film Transport

Symbol	Function	Location / Wires	Symptoms of Malfunction
SW - 21	Checks for Cassette	Film Chamber Gray Wire	**Shorted:** No Film Transport. **Open:** Film Motor runs without film.
SW - 22	Check Film Door	Above Rewind Fork	**Shorted:** No Film Transporty. **Open:** Film Motor runs with door open.
SW - 27	Check Wind Completion	Top Right Yellow, Black Wire	**Shorted or Open:** Film wind doesn't stop.
SW - 32	Checks Sprocket Movement	Above Sprocket Yellow, Black Wire	**Shorted or Open:** Film wind doesn't stop.
SW - 41,42	Checks Frame Count from DX	Film Chamber	**Shorted or Open:** No autor rewind by frame count.
SW - 11	Manual Rewind	Right Side Panel	**Open:** No manual rewind.

Flash

SW - X	Triggers Flash	Shutter Unit	**Shorted:** Flash always fires. **Open:** Flash won't fire.

Self Timer

SW - 23	Self-timer	Right Side Panel	**Open:** No Self-timer

Illuminator

SW - 28	LCD, Finder Lamps	Right Side Panel	**Open:** No Lamps

V. EXTERNAL TESTS

* **Check visually for signs of drop damage, sand or liquid intrusion.**

1. **Test power circuit.** Set power supply to 6 volts / 2 Amp. Main switch 'L'; standby current 10µA<>100µA, LCD blank. Main switch 'A'; current switches to 63mA for two seconds, LCD turns on,. Viewfinder LED should turn on when release is depressed 1/2 stroke, current 70mA.

   Camera operates with battery voltage above 4.5 volts. Battery check button is in right side compartment.

   Note: If finder LEDs do not turn on, check finder switch in right side panel. If LCD displays blinking **bc** but manual battery check displays two or three bars see release malfunctions. If LCD displays 'EEE' see release malfunctions.

2. **Test control dial.** Main switch 'A'. Select Tv or Av mode, rotate control dial on handgrip. LCD information should change.

3. **Test lightmeter, display.** Lens installed. Depress meter button and rotate control dial, LCD should change between average, partial and spot icons. Select average or partial, depress release 1/2 stroke several times checking finder for change with light. Select spot, re-check finder for changes with light. While in spot, depress one point spot button near release button, LCD should show fixed point. Use highlight and shadow buttons top back right, LCD fixed point should increase and decrease. Depress ISO button and select ISO different than test cassette, LCD displays ISO. Insert test cassette, LCD displays cassette ISO during first frame advance. Remove lens, select 'Av' mode rotate control dial; LCD should display Av no faster then F 5.6. Install lens and in 'Av'

mode rotate control dial; LCD displays Av up to lens speed. Select 'Tv' mode rotate control dial; finder displays auto corresponding to Tv changes. Depress exposure compensation button and rotate control dial, LCD compensation should change.

Set lens from 'A' to manual, LCD displays **M**. Move depth of field preview slide, LCD displays aperture icon. In 'Av', 'P' or 'Program' modes finder displays shutter speed. In 'Tv' mode finder displays either 'OP' / open aperture, 'OO' / correct exposure or 'CL' / close aperture.

Note: If lens is in 'A' when depth of field preview is used; LCD displays 'EEE'.

4. **Test release.** Remove lens depress release fully; mirror should cycle, finder LEDs turn off. Select 'L' and then 'H' drive mode; check release in each mode, charge is quicker in 'H' drive. Install lens set on manual, check release.

   Note: Drive mode switch is in right side panel. If LCD displays flash cassette icon cycle film door.

5. **Test Shutter.** Select 'Tv' mode and open film door. Release camera, observe shutter at slow and high speeds.

6. **Test Aperture.** Remove lens. Move depth of field preview slide; stop down lever moves completely left, check auto aperture lever manually for free travel. Without lens LCD displays **M**. Install lens release camera, check manual aperture selection. Set lens to 'A', **M** turns off. Release camera, check auto aperture selection.

7. **Test film transport.** With film door open press frame number sensing pad, LCD should display cassette icon. Close film door without film, wind motor should not run. Load test roll and close film door; LCD should display cassette icon, bar icons show advance, exposure advances to '1'. Advance film within 12 frames from end of roll, check finder LCD for 'F'. Continue advancing film while watching finder LCD, 'F' changes to nine and counts down. Auto rewind starts as finder count reaches '0'. Repeat test advance film several frames, depress manual rewind button in right side panel. Film should rewind.

8. **Test Flash / Shoe.** Connect VC / CCC contact to ground through 3KΩ, release camera in program. Shutter speed should be 1/250. Short VC / CCC to AVEF while grounding VC / CCC through 3KΩ, finder displays F/4. Exposure should be 1/250 at F/4. Use DVM Ω mode read between X contact and ground, release on 'B' mode. Resistance should be near infinite before release and near 0Ω with shutter open. Install 300TL flash, use tester to check flash exposure at several distances. Select FE-TTL on flash and press stop meter button, check for pre-flash

9. **Test remaining Bells and Whistles.** Right side panel; self-timer, finder control (illuminator, finder on, finder off). Double Exposure (depress mode and meter button top left); LCD displays 'ME' frame count changes to '1', exposures are selectable through control dial. Safety Shift (depress Exposure Compensation and ISO); LCD displays SS, manual shutter speeds are overridden if incorrect.

Note: For malfunctions not specifically covered in Troubleshooting see circuit discretions and schematics.

VI. TROUBLESHOOTING

1. Power ..... Page 10
2. Control Dial ..... Page 13
3. Light Meter ..... Page 14
4. Release ..... Page 16
5. Shutter ..... Page 20
6. Aperture ..... Page 22
7. Film Transport ..... Page 24
8. Flash ..... Page 27

1. Power Circuit Malfunctions

Note : Do External Test #1 to define malfunctions

A. External Observations

LCD stays Blank with main switch on 'A'.
Current remains 0μA<> 20μA with main switch on 'L' or 'A'.
No Functions

Remove Battery Chamber

Note : Ground / unground **TP-7** between tests.

Install batteries:
• Check **TP-1A** for **B+** and **TP-1B** for **B-** .
— No → • Check battery contacts, wires, soldering.

Yes

Unsolder Y **SW-3** wire. Ground / unground **TP-7** .
• Check for normal operation.
— Normal → • Check **SW-3** , 2 Y wires, soldering.

No Change

Lift LCD:
• Check pin 58, 57, 53 or 23, **IC-3** for typical 5.5 volts.
— No → • Check diode **D-3** . Replace if defective.
• Use schematic to check Y wire **TP-8A** , **B**; **D-3** paths. Repair wire, soldering or **Main FPC** if defective.

Yes

Move main switch from 'L' to 'A':
• Check **TP-2** to switch to 6 volts for typical 2 seconds.
— Yes → • **IC-3** may be defective. Replace **Main FPC** .

No

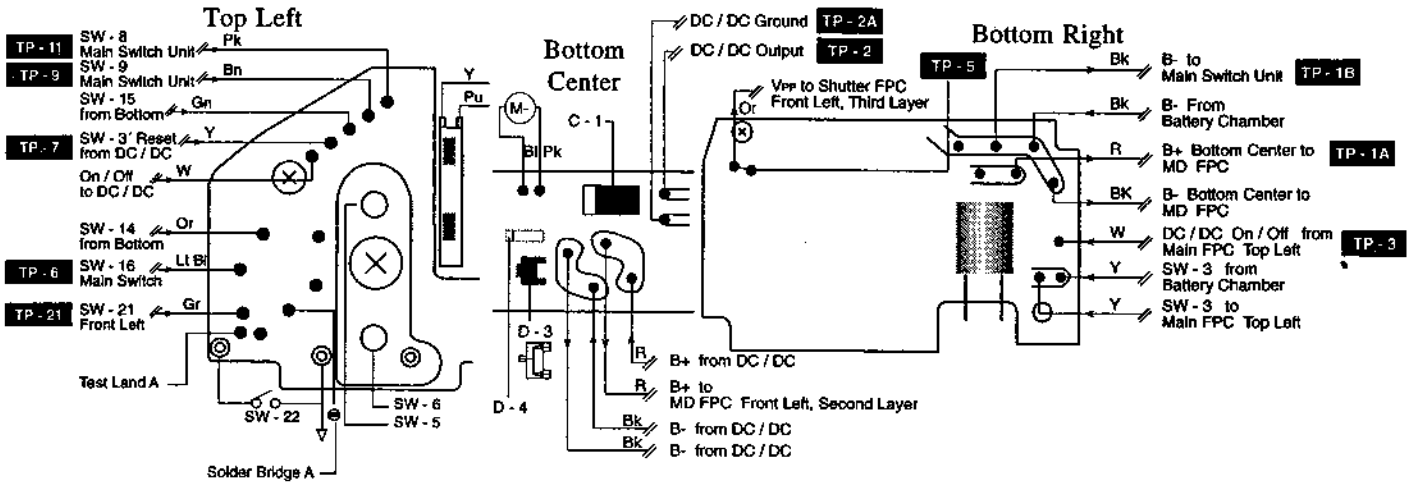
Ground pin 19, **IC-3** while moving main switch from 'L' to 'A':
• Check for LCD to turn on.
— Yes → • Check, clean, align front left connector, **SP FPC** . Retest.
• Check **SW-13** left side of mirror box, closed with mirror down.

No

• Resolder **TP-2** , **TP-2A** . Retest.
• Check R wire **TP-9A**, **B**, soldering. Resolder or replace if defective.
• Resolder **Clk** near **IC-3** . Retest.

Ground **TP-6** :
• Check for LCD to turn on. Repair main switch, **SW-16** , Lt Bl, Bk wires, soldering if LCD turns on.

Ground **TP-3** :
• Check for **TP-2** to switch to 6 volts. Replace DC/DC Convertor if **TP-2** doesn't switch to 6 volts.
* Ground **SW-3** solder point to reset camera.
• Resolder pins 22, 36, **IC-3** . Retest.
• Use schematic to check **SW-16** and pin 36, **IC-3** paths. Repair **Main FPC** if defective.
• **IC-3** may be defective. Replace **Main FPC** .

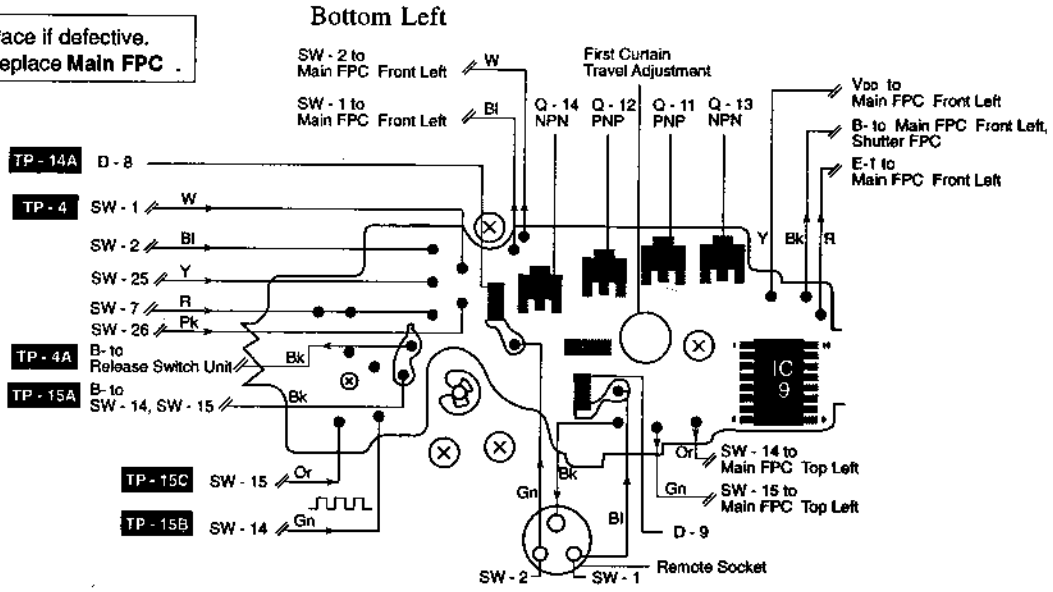

Top Left
TP - 11 SW - 8 Main Switch Unit Pk
TP - 9 SW - 9 Main Switch Unit Bn
SW - 15 from Bottom Gn
TP - 7 SW - 3' Reset from DC / DC Y
On / Off to DC / DC W
SW - 14 from Bottom Or
TP - 6 SW - 16 Main Switch Lt Bl
TP - 21 SW - 21 Front Left Gr
Test Land A
SW - 22
SW - 6
SW - 5
Solder Bridge A
Y
Pu
Bottom Center
C - 1
Bl Pk
D - 3
D - 4
DC / DC Ground TP - 2A
DC / DC Output TP - 2
VPP to Shutter FPC Front Left, Third Layer
Or
R
B+ from DC / DC
R
B+ to MD FPC Front Left, Second Layer
Bk
B- from DC / DC
Bk
B- from DC / DC
Bottom Right
TP - 5
Bk
B- to Main Switch Unit TP - 1B
Bk
B- From Battery Chamber
R
B+ Bottom Center to MD FPC TP - 1A
BK
B- Bottom Center to MD FPC
W
DC / DC On / Off from Main FPC Top Left TP - 3
Y
SW - 3 from Battery Chamber
Y
SW - 3 to Main FPC Top Left

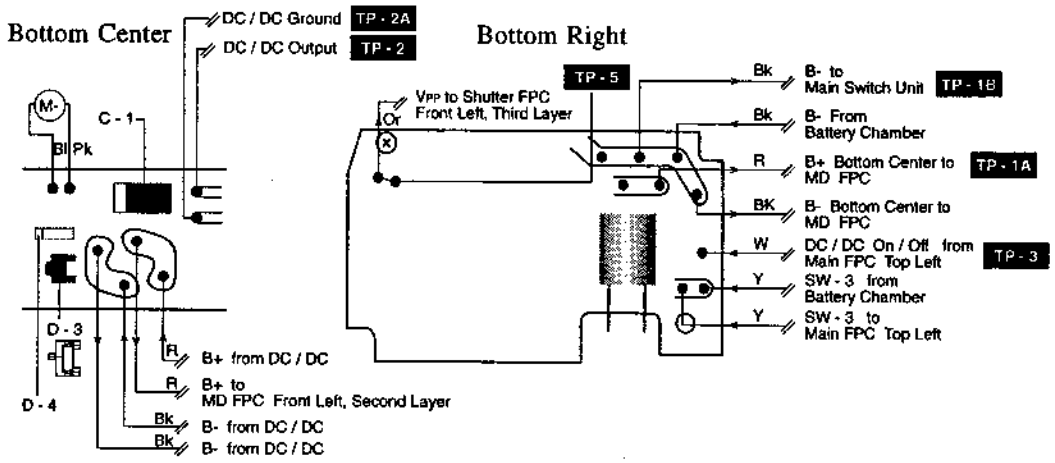
B. External Observations

Battery Drain, current above 100µA with main switch in 'L' or 'A'.
Functions may be normal, erratic or there may be no functions.

Remove Battery Chamber

- Check **TP-2** , **TP-5 DC/DC** for 0 volts. — No → Unsolder W wire at **TP-3**.
  - Recheck **TP-2** , **TP-5** for 0 volts.
    - No → **DC/DC** may be defective. Replace **DC/DC** .
    - Yes → Unsolder **SW-1** W wire at **TP-4**. If current returns to 100µA or less check **SW-1** for short. Repair if defective.
      - Unsolder W **SW-1'** wire. If current returns to 100µA or less check **SW-1'** for short repair if defective.
      - **IC-3** may be defective. Replace **Main FPC** .
- Yes → Desolder **V-Bat** Front Left:
  - Check for current to be less than 100µA.
    - Yes → **MD FPC** may be defective. Replace **MD FPC** .
    - No →
      - Check **C-6** for short. Replace if defective.
      - **IC-3** may be defective. Replace **Main FPC** .


Bottom Left
SW - 2 to Main FPC Front Left
SW - 1 to Main FPC Front Left
First Curtain Travel Adjustment
Q - 14 NPN
Q - 12 PNP
Q - 11 PNP
Q - 13 NPN
Vpp to Main FPC Front Left
B- to Main FPC Front Left, Shutter FPC
E-1 to Main FPC Front Left
TP - 14A D - 8
TP - 4 SW - 1
SW - 2
SW - 25
SW - 7
SW - 26
TP - 4A B- to Release Switch Unit
TP - 15A B- to SW - 14, SW - 15
TP - 15C SW - 15
TP - 15B SW - 14
IC 9
SW - 14 to Main FPC Top Left
SW - 15 to Main FPC Top Left
D - 9
Remote Socket
SW - 2
SW - 1


Bottom Center
DC / DC Ground TP - 2A
DC / DC Output TP - 2
C - 1
D - 3
D - 4
B+ from DC / DC
B+ to MD FPC Front Left, Second Layer
B- from DC / DC
B- from DC / DC
Bottom Right
TP - 5
Vpp to Shutter FPC Front Left, Third Layer
B- to Main Switch Unit TP - 1B
B- From Battery Chamber
B+ Bottom Center to MD FPC TP - 1A
B- Bottom Center to MD FPC
DC / DC On / Off from Main FPC Top Left TP - 3
SW - 3 from Battery Chamber
SW - 3 to Main FPC Top Left

C. External Observations

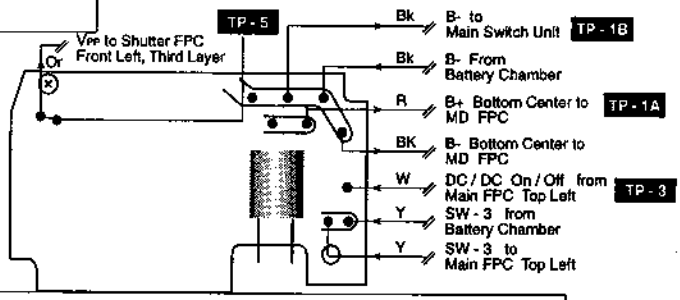
Viewfinder LED's do not turn on in Pre-Release.
LCD turns on when main switch is moved to 'A'.
No functions.

Depress Exposure Preview Button:
• Check for Viewfinder LED's to turn on.

Yes → Remove Battery Chamber:
• Resolder W, Bk wires at **TP-4, TP4A** . Retest.
• Check **SW-1** , W and Bk wires, soldering. Repair if defective.
• Check diode **D-9.** Replace if defective.

No →
• Resolder pin 7, **IC-3.** Retest.
• Use schematic to check pin 7, **IC-3** paths. Repair **Main FPC** if defective.
• **IC-3** may be defective. Replace **Main FPC.**

Bottom Right



D. External Observations

Current above 160mA in Pre-Release.
LCD turns on when main switch is moved to 'A'.
Functions may be normal, erratic or no functions.

Remove Battery Chamber

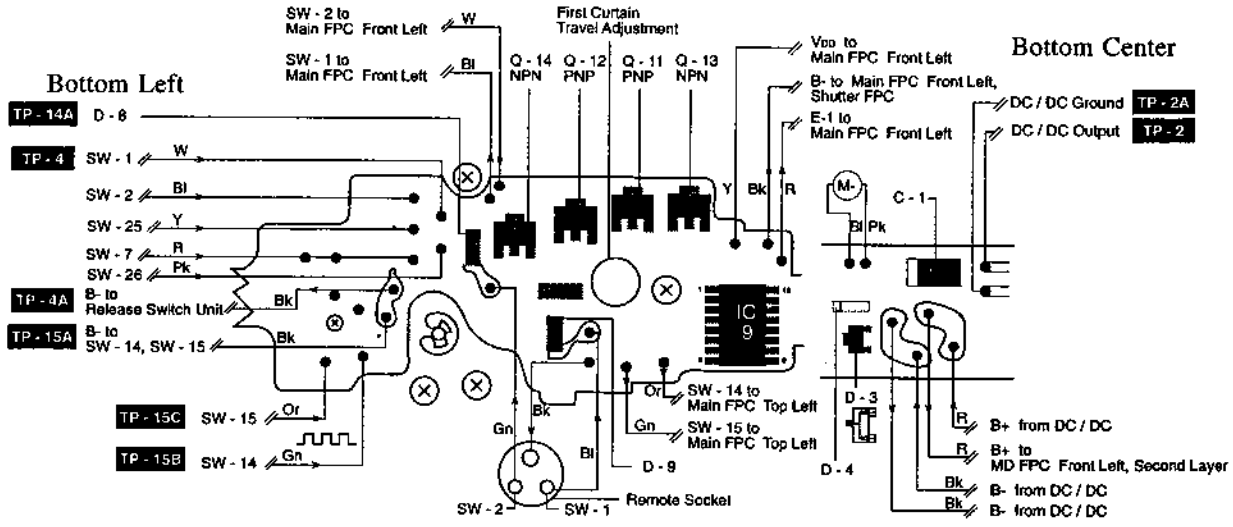
Unsolder Or wire at **TP-5:**
• Recheck Pre-Release current.

Typcial → • Check **C-19** , **C-20** , **Q-1** and **Q-2** on **Shutter Unit** for short. Replace if defective.
• **IC-4** may be defective. Replace **Main FPC** .

Not Typcial →
• Check **C-1** for short. Replace if defective.
• Unsolder R wire from **Reset FPC.** Re-check current. Replace **Reset FPC** if currrent normal.
• **Main FPC** may be defective. Replace **Main FPC.**

Bottom Left

Bottom Center


SW - 2 to Main FPC Front Left
W
SW - 1 to Main FPC Front Left
Bl
First Curtain Travel Adjustment
Q - 14 NPN
Q - 12 PNP
Q - 11 PNP
Q - 13 NPN
Vpp to Main FPC Front Left
B- to Main FPC Front Left, Shutter FPC
E-1 to Main FPC Front Left
DC / DC Ground
TP - 2A
DC / DC Output
TP - 2
TP - 14A
D - 8
TP - 4
SW - 1
SW - 2
SW - 25
SW - 7
SW - 26
TP - 4A
B- to Release Switch Unit
TP - 15A
B- to SW - 14, SW - 15
TP - 15C
SW - 15
TP - 15B
SW - 14
IC 9
C - 1
D - 3
D - 4
D - 9
SW - 14 to Main FPC Top Left
SW - 15 to Main FPC Top Left
B+ from DC / DC
B+ to MD FPC Front Left, Second Layer
B- from DC / DC
B- from DC / DC
Remote Socket
SW - 2
SW - 1

1. Control Dial Malfunctions

Note : Do External Test #1, 2 to define malfunctions.

A. External Observations

LCD information doesn't change when command dial is rotated.
Power, Pre-Release normal.
Other functions normal.

Remove Battery Chamber

• Resolder Pk, Y **SW-25** , **SW-26** wires. Retest.
• Check **SW-35** , **SW-26** , wires, soldering between Y & Pk wires and Bk wire at **TP-4A** . Repair if defective.
• Check, clean, align front left connector. Retest.
• **IC-6** or **IC-3** may be defective. Replace **Main FPC** .

3. Lightmeter Malfunctions

Note : Do External Tests #1, 2, 3 to define Lightmeter Malfunctions.

A. External Observations

Finder does not show changes with light in eather Average or Spot modes.
Finder shows changes with light in one meter mode.
Power, Control Dial normal.

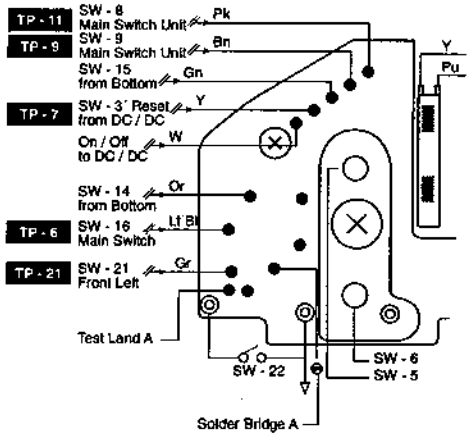
Finder shows changes in Average mode. —Yes— Remove front apron:
- Check, clean, align front left connector. Retest.
- **IC-2** may be defective. Replace **SP FPC** .

No

- **IC-1** may be defective. Replace **IC-1** or **Main FPC** .

Note : If Finder does not show changes with light in both Average and Spot modes, **IC-4** may be defective. Replace **Main FPC** .

Top Left



B. External Observations

LCD does not display ISO number when ISO button is pressed.
Power, Control Dial normal.

Remove Front, Top Covers.

Ground **TP-11** through 0Ω:
- Check for LCD to display ISO number.

—Yes— •Check **SW-8** , Pk wire, soldering. Repair, resolder if defective.

No

- Resolder pin 12 **IC-3** . Retest.
- Use schematic to check **SW-8** paths. Repair **Main FPC** if defective.
- **IC-3** may be defective. Replace **IC-3** or **Main FPC** .

C. External Observations

ISO number does not reset during 1st frame advance.
ISO number may blink or show incorrect number.
Manual ISO selection normal.
Power, Control Dial normal.

Note : Film Transport must operate to reset ISO

- Check Cassette light seal and pressure plate. —Bad— • Repair or replace light seal or pressure plate.

Good

Remove Front, Top Covers, bottom center switch block, access **D FPC** under **Main FPC** Top Left:
- Use schematic to check **DX** paths for 0Ω. Repair or replace **DX FPC** if defective.
- Resolder **D FPC** / **DX FPC** Top Left, Prism Left. Retest.
- **IC-8** may be defective. Replace **D FPC** .

D. . External Observations

With lens removed, LCD can display Av faster then F 5.6 or can not display F 5.6. Or with lens installed LCD can display Av faster then lens wide open aperture or cannot display wide open aperture.
Lightmeter display incorrect or does not correspond to lens Avo changes.
Control dial normal.
ISO selection normal.
Power normal.

Remove Front, Top Covers

With release depressed 1/2 stroke, slowly depress Avo pin:
- Check **TP-11A** to switch from low to high.
- Check **TP-11B** to switch from high to low.
- Check **TP-11C** to switch from low to high to low.
- Check **TP-11D** to switch high, low, high, low.

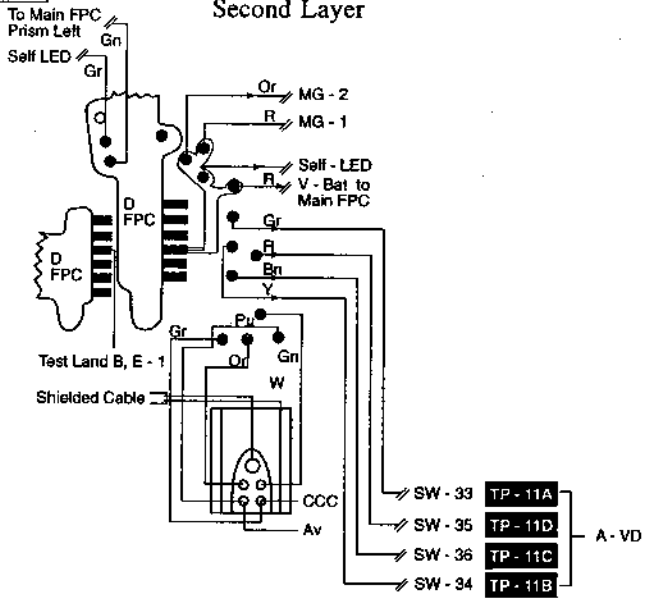
* Typical high = 5 volts, typical low = near 0 volts

No → • Use schematic to check bad Avo switch paths. Repair Avo switch if defective.

Yes

• **IC-5** may be defective. Replace **Main FPC** .

Top Prism Left,
Second Layer



E. External Observations

Does not lightmeter correctly in stop down meter mode. LCD may display 'EEE' when using stop down metering.
Open metering normal.
Power, control dial is normal.

Remove Front, Top Covers

• Check for LCD to display ■ with lens in manual. → No → Lift LCD, ground pin 24, **IC-3** through 0Ω:
- Check for display to display ■ .

* If LCD displays ■ , **SW-17** , front left connector, or paths may be defective. Use schematic to check, repair **SW-17** , connector or paths.
* If LCD does not display ■ , **IC-3** may be defective. Replace **IC-3** or **Main FPC** .

Yes

• Check for LCD to display aperture icor when depth of field preview slide is depressed. → No → Ground **TP-13** through 0Ω:
- Check for LCD to display aperture icon:

* If LCD displays aperture icon, **SW-20** , Bn wire, or soldering may be defective.
* If LCD does not display aperture icon :
- Resolder pin 27, **IC-3** . Retest.
- Use schematic to check pin 27, **IC-3** paths. Repair **Main FPC** if defective.
- **IC-3** may be defective. Replace **IC-3** or **Main FPC** .

Yes

With depth of field preview slide depressed:
- Check for lens to be stopped down.

→ No → • Check stopped down lever, mechanical system.

Yes

• **IC-5** may be defective. Replace **Main FPC** .

4. Release Malfunctions

Note : Do External Tests #1, 2, 3, 4 to define Release Malfunctions

A. External Observations

No Release when release button fully depressed, lens off.
Display stays on when release button fully depressed.
No current increase when release button fully depressed.
Power, control dial, lightmeter normal.

Depress Release 1/2 stroke, short B- and **SW-2** Remote Cable pins:
• Check for Release.

Yes →
Remove Covers, battery chamber:
• Check Gn **SW-2** wire, soldering, bottom left. Resolder if defective.
Depress Release fully:
• Check for 0Ω between Bk B- wire and Gn **SW-2** wire. Remove grip repair, resolder **SW-2** , wires if defective.
• Resolder release button switch. Retest.
• Check **SW-2** . Clean, repair or replace if defective.

No
Remove Covers

Depress Release 1/2 stroke, ground **TP-14A** through 0Ω:
• Check for Release.

Yes →
• Resolder **D-8** . Retest release.
• Check **D-8** , paths back to **SW-2** . Repair or replace if defective.

No

Depress Release 1/2 stroke, ground **TP-14B** through 0Ω:
• Check for Release.

Yes →
• Resolder Bl **SW-2** wire. Retest release.
• Check Bl wire, paths back to **D-8** . Repair if defective.

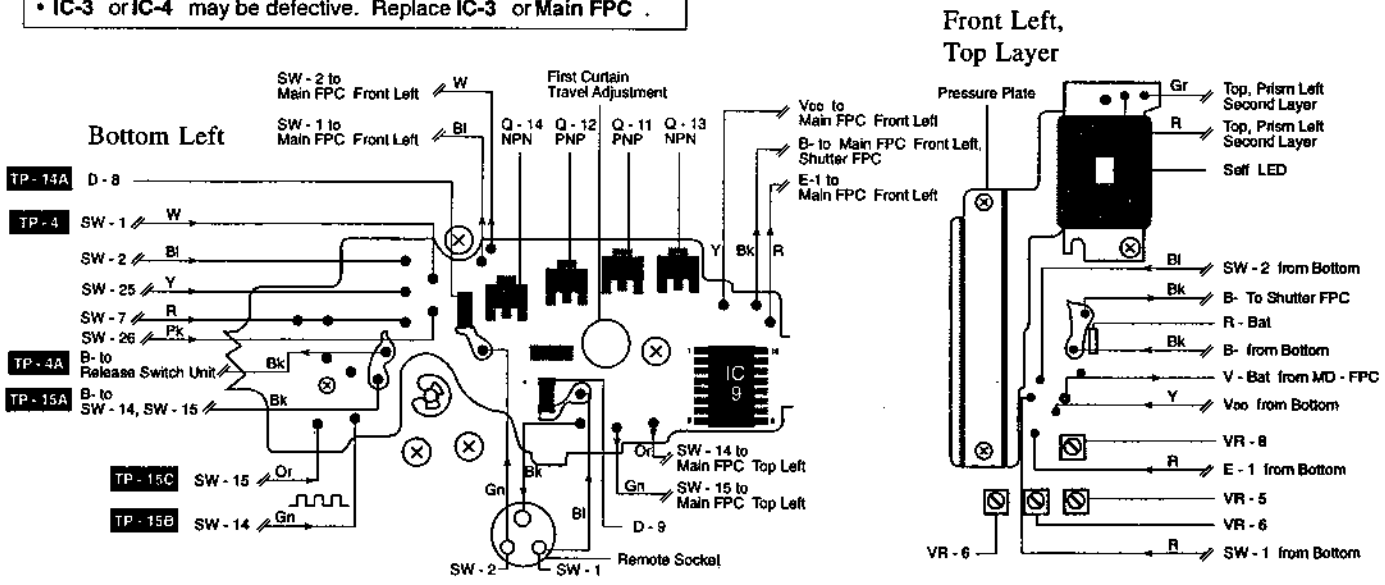
No

• Resolder pin 5, **IC-3** . Retest release.
Depress Release 1/2 stroke, ground pin 5, **IC-3** through 0Ω:
• Check for Release.

Yes →
• Use schematic to check pin 5, **IC-3** path back to **TP-14B** . Repair if defective.

No

• **IC-3** or **IC-4** may be defective. Replace **IC-3** or **Main FPC** .


Bottom Left
Front Left, Top Layer
SW - 2 to Main FPC Front Left
SW - 1 to Main FPC Front Left
First Curtain Travel Adjustment
Q - 14 NPN
Q - 12 PNP
Q - 11 PNP
Q - 13 NPN
Vcc to Main FPC Front Left
B- to Main FPC Front Left, Shutter FPC
E-1 to Main FPC Front Left
TP - 14A D - 8
TP - 4 SW - 1
SW - 2
SW - 25
SW - 7
SW - 26
TP - 4A B- to Release Switch Unit
TP - 15A B- to SW - 14, SW - 15
TP - 15C SW - 15
TP - 15B SW - 14
SW - 14 to Main FPC Top Left
SW - 15 to Main FPC Top Left
D - 9
Remote Socket
SW - 2
SW - 1
IC 9
Pressure Plate
Top, Prism Left Second Layer
Top, Prism Left Second Layer
Self LED
SW - 2 from Bottom
B- To Shutter FPC
R - Bat
B- from Bottom
V - Bat from MD - FPC
Vcc from Bottom
VR - 8
E - 1 from Bottom
VR - 5
VR - 6
SW - 1 from Bottom
VR - 6

B. External Observations

No Release when release button fully depressed, lens off.
Display turns off when release button fully depressed.
Power, control dial, lightmeter normal.

Remove Covers

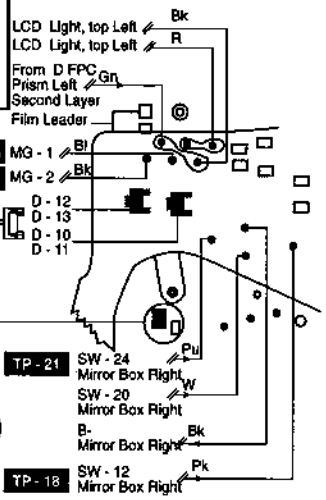
Briefly ground **TP-15** through 0Ω.
• Check for click from **MG-2** or mirror release.

Yes →
If you hear click but no mirror release:
• Remove mirror box. Check diaphragm stop down system, mirror levers, springs, mirror up latch left side of mirror box.
If mirror releases:
• * Clean **MG-2** . Retest.
Note : **MG-2** shield is open on bottom and can be accessed w/o removal of mirror box.
• **IC-4** or **IC-3** may be defective. Replace **Main FPC** .

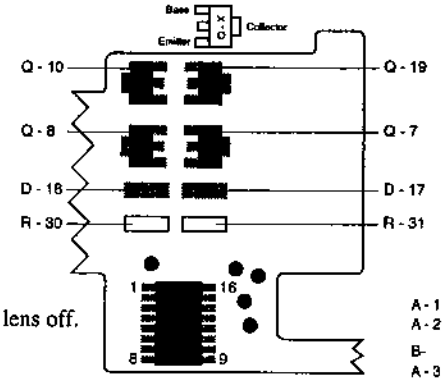
No

• * Clean **MG-2** . Retest.
Note : **MG-2** shield is open on bottom and can be accessed w/o removal of mirror box.
• Check **TP-15** for 6 volts. Check **MG-2** for typical 67Ω from prism wires and path to **V-Bat** if defective.
Remove Mirror Box:
• Check **MG-2** . Clean, reseat spring, repair or replace **MG-2** if defective.

Top, Prism Left



Handgrip, Charge Motor Removed



C. External Observations

Mirror stays up or starts up, tested with lens off.
LCD may display blinking '**bc**'

Gently Pull mirror down:
• Check for mirror to return to viewing position.

Yes → • Mirror bumper near viewing screen may be sticky, replace.

No

• Check focal plane to see if shutter is charged or released.

Charged → • See Shutter Malfunctions.

Released
Remove Covers, Battery Chamber, Handgrip

• Resolder **M-2** wires. Retest.
Apply battery power directly to **M-2** solder points. Reverse leads between tests.:
• Check for motor to turn in both directions, planatary gears shift in and out.

No Movement → • Remove **M-2.** Retest motor. If motor does not turn or turns slowly, replace **M-2** .
• Check gears / cam for obstruction. Repair or Replace if defective.

Motor Runs in both directions
Gears Turn

Remove **M-2** :
Apply **B-** through 1KΩ probe to base **Q-8** and **B+** through 1KΩ probe to base **Q-9** :
• Check for **M-2** to run.

No → • Resolder **Q-8** , **Q-9** . Retest.
• Use schematic to check **Q-8** , **Q-9** paths. Repair if defective.
• Test **PNP Q-8** . Replace if defective.
• Test **NPN Q-9** . Replace if defective.

Yes

With **M-2** removed:
Apply **B-** through 1KΩ probe to base **Q-7** and **B+** through 1KΩ probe to base **Q-10** :
• Check for **M-2** to run.

No → • Resolder **Q-7** , **Q-10** . Retest.
• Use schematic to check **Q-7** , **Q-10** paths. Repair if defective.
• Test **PNP Q-10** . Replace if defective.
• Test **NPN Q-7** . Replace if defective.

Yes

• **IC-10, IC-5** or **IC-3** may be defective. Replace **IC-10** or **MD FPC** and retest.

D. External Observations

LCD displays '**EEE**' or blinking **bc**. Finder displays '**Help** ' Release tested with lens off.
Camera may release once and / or charge motor may cycle once or twice.
In manual battery check LCD displays three bars or power is know good 6 volt / 2 Amp.
No functions in '**EEE**' or blinking **bc**.

• Check for bad batteries or power pack not set to 6 volts / 2A with 0.4Ω. — No → • Replace batteries or reset power pack.

Yes

Remove Covers, Battery Chamber, Handgrip

Reset by grounding **SW-3** solder point. Depress Release 1/2 stroke:
• Check **VPP** outputof **DC/DC** for typical 15 volts. — No → • **DC/DC** may be defective. Replace or repair **DC/DC** .

Yes

• Check for typical 0Ω between **TP-15A** and **B-**.
• Check for typical 0Ω between **TP-15A** and **TP-15B** .
• Check for typical 0Ω between **TP-15A** and **TP-15C** .
• Use schematic, illustrations to check **SW-14** , **SW-15** wires, paths to **IC-3** .
• Resolder **SW-14** , **SW-15** wires, **D-10** ,**11** and **D-12** , **13** pins 20, 21, **IC-3** . Retest after grounding **SW-3** solder point.
• Test diodes **D-10** , **11** and **D-12** , **13** . — No → Use schematic:
• Repair path between **TP-15A** and **B-**.
• Check **SW-14** , soldering, wires. Repair if defective.
• Check **SW-15** , soldering, wires. Repair if defective.
• Repair **SW-14** , **SW-15** paths, wires to **IC-3** .
• Replace **D-10** , **11** or **D-12** , **13** .

Yes

Lift LCD:
• Check between pin 19, **IC-3** and **B-** for typical 0Ω. — No → • Check, clean align front right connector. Retest.
Remove mirror box:
• Use schematic to check mirror **SW-13** , soldering, paths. Repair or replace **SP FPC** or **Main FPC** .

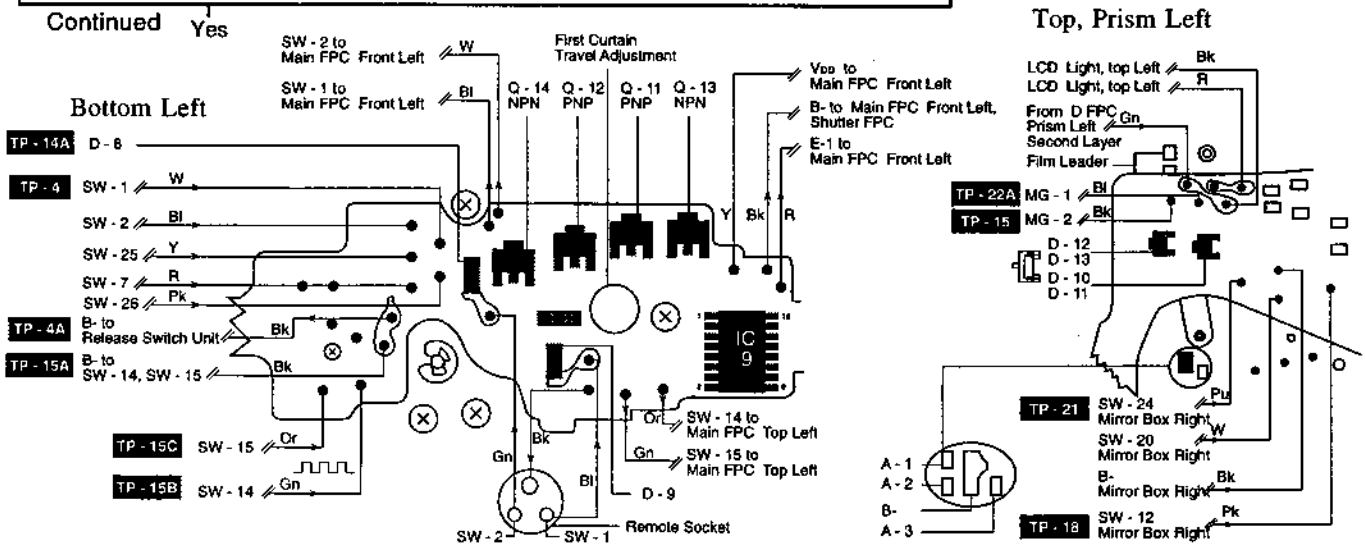
Yes

• Resolder **Shutter FPC** , **Main FPC** connectors prism right.
Retest after grounding **SW-3** solder point.
With shutter cocked:
• Check for 0Ω between **TP-16A** and **B-** .
• Check for 0Ω between **TP-16B** and **B-** . — No → • Use schematic to check for open **SW-18** , soldering, paths. Repair **SW-18** or **Shutter FPC** .
• Use schematic to check for open **SW-19** , soldering, paths. Repair **SW-19** or **Shutter FPC** .

Yes

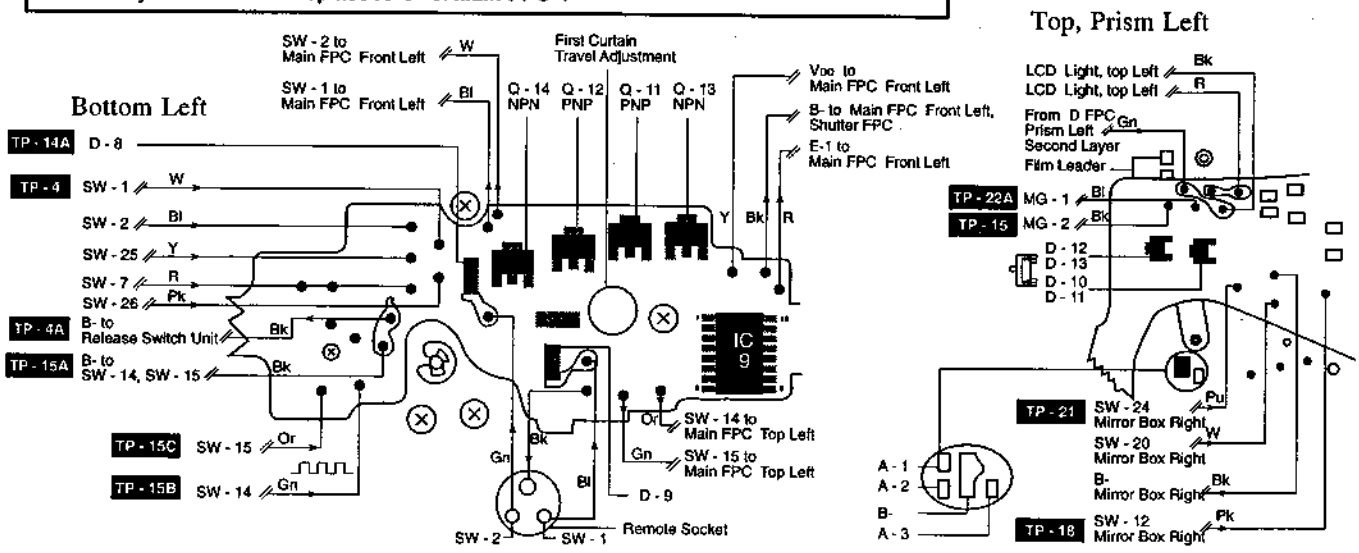
Unsolder Or **VPP** wire at **DC/DC** . Remove **B+** from battery wire and connect to Or **VPP** wire.
Release 1st Curtain by appling **B+** through **1KΩ** to **TP-17A** :
• Check for near infinite Ω between **TP-16A** and **B-** .
Release 2nd Curtain by appling **B+** through 1KΩ to **TP-17B** :
• Check for near infinite Ω between **TP-16B** and **B-** .
Note : If shutter does not release see Shutter Malfunctions. — No → • Repair **SW-18** .
• Repair **SW-19** .

Continued Yes


Bottom Left
Top, Prism Left
First Curtain Travel Adjustment
SW - 2 to Main FPC Front Left
SW - 1 to Main FPC Front Left
Q - 14 NPN
Q - 12 PNP
Q - 11 PNP
Q - 13 NPN
Vpp to Main FPC Front Left
B- to Main FPC Front Left, Shutter FPC
E-1 to Main FPC Front Left
TP - 14A D - 8
TP - 4 SW - 1
SW - 2
SW - 25
SW - 7
SW - 26
TP - 4A B- to Release Switch Unit
TP - 15A B- to SW - 14, SW - 15
TP - 15C SW - 15
TP - 15B SW - 14
IC 9
SW - 14 to Main FPC Top Left
SW - 15 to Main FPC Top Left
D - 9
SW - 2
SW - 1
Remote Socket
LCD Light, top Left
LCD Light, top Left
From D FPC Prism Left Second Layer Film Leader
TP - 22A MG - 1
TP - 15 MG - 2
D - 12
D - 13
D - 10
D - 11
TP - 21 SW - 24 Mirror Box Right
SW - 20 Mirror Box Right
B- Mirror Box Right
TP - 18 SW - 12 Mirror Box Right
A - 1
A - 2
B-
A - 3

Continued Yes

- Remove Handgrip:
- Resolder **M-2 , Q-7 , Q-8 , Q-9 , Q-10** . Retest.
- Check charge **M-2** gears, shutter charging system, *shutter for smooth low drag operation.
- **IC-3** may be defective. Replace **IC-3** or **Main FPC** .


Bottom Left
Top, Prism Left
SW - 2 to Main FPC Front Left
SW - 1 to Main FPC Front Left
First Curtain Travel Adjustment
Q - 14 NPN
Q - 12 PNP
Q - 11 PNP
Q - 13 NPN
Vcc to Main FPC Front Left
B- to Main FPC Front Left, Shutter FPC
E-1 to Main FPC Front Left
TP - 14A D - 8
TP - 4 SW - 1
SW - 2
SW - 25
SW - 7
SW - 26
TP - 4A B- to Release Switch Unit
TP - 15A B- to SW - 14, SW - 15
TP - 15C SW - 15
TP - 15B SW - 14
IC 9
SW - 14 to Main FPC Top Left
SW - 15 to Main FPC Top Left
D - 9
Remote Socket
SW - 2
SW - 1
LCD Light, top Left
LCD Light, top Left
From D FPC Prism Left Second Layer Film Leader
TP - 22A MG - 1
TP - 15 MG - 2
D - 12
D - 13
D - 10
D - 11
TP - 21 SW - 24 Mirror Box Right
SW - 20 Mirror Box Right
B- Mirror Box Right
TP - 18 SW - 12 Mirror Box Right
A - 1
A - 2
B-
A - 3

E. External Observations

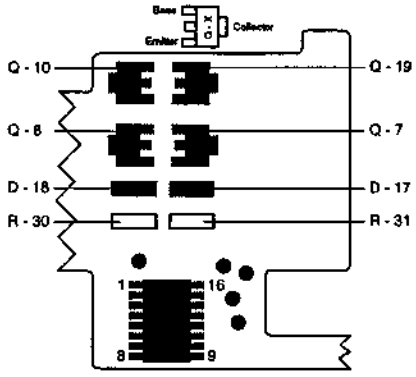
Drive mode switches from 'H' to 'L' spontaneously. Release tested with lens off.
Release normal.
Power, control dial, lightmeter normal.

Remove Covers, Battery Chamber,
- Resolder **SW-14 , SW-15** wires, **D-10 ,11** and **D-12 , 13** pins 20, 21, **IC-3** . Ground **SW-3** solder point, Retest.

Rotate Charge Cam Gear:
- Check for **SW-15** to open and close between **TP-15A** and **TP-15C** . Repair **SW-15** if defective.
- Test diodes **D-10 , 11** and **D-12 , 13** . Replace **D-10 , 11** or **D-12 , 13** if defective.

Remove Handgrip:
- Resolder **M-2 , Q-7 , Q-8 , Q-9 , Q-10** . Retest.
- Check charge **M-2** gears, shutter charging system and *shutter for smooth low drag operation.
- Motor **M-2** may be defective. Replace **M-2** and Retest.

Handgrip, Charge Motor Removed



F. External Observations

Charge motor runs continuously after mirror returns or with batteries inserted.

Remove Covers, Battery Chamber

With Shutter, Mirror and Charge Cam Gear at charged position:
- Check for typical 0Ω between **TP-15A** and **B-** .
- Check for typical 0Ω between **TP-15A** and **TP-15B** .
- Check for typical 0Ω between **TP-15A** and **TP-15C** .

Rotate Charge Cam Gear:
- Check for open between **TP-15A** and **TP-15B** .
- Check for open between **TP-15A** and **TP-15C** .

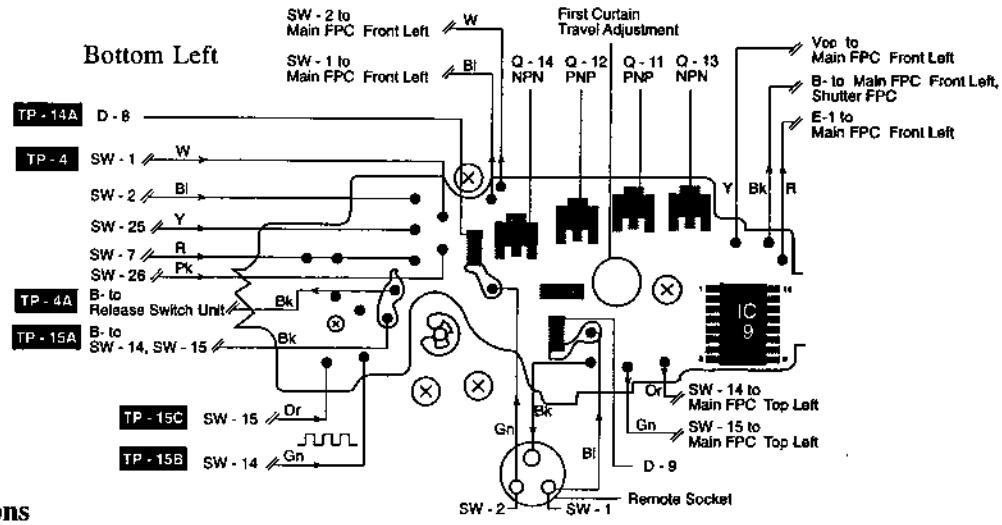
No →
Use schematic:
- Repair path between **TP-15A** and **B-** .
- Check **SW-14** , soldering, wires. Repair if defective.
- Check **SW-15** , soldering, wires. Repair if defective.
- Repair **SW-14 , SW-15** paths, wires to **IC-3** .
- Replace **D-10 , 11** or **D-12 , 13** .

Yes Continued

Continued

Yes

Rotate Charge Cam Gear:
- Check for **SW-15** to open and close between **TP-15A** and **TP-15C**. Repair **SW-15** if defective.
- Use schematic, illustrations to check **SW-14, SW-15** wires, paths to **IC-3**.
- Resolder **SW-14, SW-15** wires, **D-10, 11** and **D-12, 13** pins 20, 21, **IC-3**.
- Test diodes **D-10, 11** and **D-12, 13**. Replace **D-10, 11** or **D-12, 13** if defective.
- **IC-3** or **IC-5** may be defective. Replace **Main FPC**.


Bottom Left
SW - 2 to Main FPC Front Left
SW - 1 to Main FPC Front Left
First Curtain Travel Adjustment
Q - 14 NPN
Q - 12 PNP
Q - 11 PNP
Q - 13 NPN
Vop to Main FPC Front Left
B- to Main FPC Front Left, Shutter FPC
E-1 to Main FPC Front Left
TP - 14A
TP - 4
TP - 4A
TP - 15A
TP - 15C
TP - 15B
SW - 1
SW - 2
SW - 25
SW - 7
SW - 26
B- to Release Switch Unit
B- to SW - 14, SW - 15
SW - 15
SW - 14
IC 9
SW - 14 to Main FPC Top Left
SW - 15 to Main FPC Top Left
D - 9
Remote Socket

G. External Observations

No Release with customers lens set to manual. LCD displays ' **EEE**'.
Release normal without lens and with test lens.
Power, control dial, lightmeter normal.

- Check for off brand lens. Repair diaphragm stop down pressure, may not be repairable.
- If Canon lens. Check diaphragm stop down pressure and see Release Malfunctions G.

5. Shutter Malfunctions

Note : Do External Tests #1, 2, 3, 4, 5 to define Shutter Malfunctions.

A. External Observations

Mirror goes up but shutter does not release.
Power, control dial, lightmeter, release normal.

- Check focal plane for shutter to start in charged position. See Illustration.

No

- See Release Malfunctions.
- Repair Shutter.

Yes

Remove Covers

With Mirror Up:
- Check between pin 19, **IC-3** and **B-** for 250KΩ or higher.

No

Remove Mirror Box:
- Check **SW-13** should be open with mirror up, use schematic to check **SW-13** path to **B-**. Repair if defective.

Yes

- **IC-3** may be defective. Replace **IC-3** or **Main FPC**.

B. External Observations

No shutter opening.
LCD displays 'EEE, finder 'Help ' after mirror cycles.
Power, control dial, lightmeter, release normal.

Unsolder Or **VPP** wire at **DC/DC** . Remove **B+** from battery wire and connect to Or **VPP** wire. Apply **B+** through **1KΩ** to **TP-17A** :
• Check for 1st Curtain release.

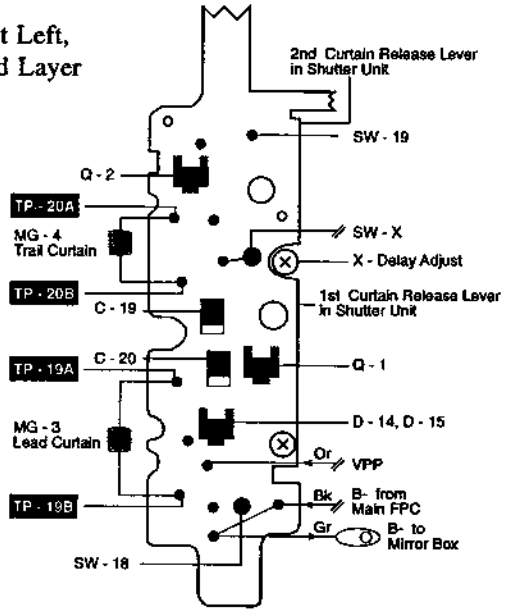
No →

Remove Front Left Connectors, expose **Shutter FPC** . Apply **B+** to **TP-19A** and **B-** to **TP-19B** .
• Check for 1st Curtain release. * Clean **MG-3** if shutter doesn't open.
• Resolder **C-20** , **MG-3** , **Q-1** , **D-14** , **15** , Or **VPP** wire.
Note : Retest by connecting Or **VPP** wire to **B+**, Bk wire to **B-** and then apply **B+** through **1KΩ** to base **Q-1** .
• Check **C-20** , **MG-3** , **Q-1** , **D-14** , **15** . Repair if defective.
• Use schematic to check **C-10** , **MG-3** , **Q-1** , **D-14** , **15** , Or wire paths. Repair if defective.
• Check shutter, mechanical system for oil, damage. Repair or send in for rebuild.

Yes ↓

• * Clean **MG-3** and resolder **Shutter FPC** connectors prism right. Retest.
• **IC-4** or **IC-3** may be is defective. Replace **Main FPC** .

Front Left,
Third Layer



C. External Observations

Shutter doesn't close.
1st curtain closes focal plane as mirror returns.
LCD displays 'EEE, finder 'Help ' after mirror cycles.
Power, control dial, lightmeter, release normal.

Unsolder Or **VPP** wire at **DC/DC** . Remove **B+** from battery wire and connect to Or **VPP** wire. Apply **B+** through **1KΩ** to **TP-17A** to release 1st Curtain. Apply **B+** through **1KΩ** to **TP-17B** :
• Check for 2nd Curtain release.

No →

Remove Front Left Connectors, expose **Shutter FPC** . Apply **B+** to **TP-20A** and **B-** to **TP-20B** .
• Check for 2nd Curtain release. * Clean **MG-4** if shutter doesn't open.
• Resolder **C-19** , **MG-4** , **Q-2** , **D-14** , **15** .
Note : Retest by connecting Or **VPP** wire to **B+**, Bk wire to **B-** and then apply **B+** through **1KΩ** to base **Q-2** .
• Check **C-19** , **MG-4** , **Q-2** , **D-14** , **15** . Repair if defective.
• Use schematic to check **C-19** , **MG-4** , **Q-2** , **D-14** , **15** paths. Repair if defective.
• Check shutter, mechanical system for oil, damage. Repair or send in for rebuild.

Yes ↓

• * Clean **MG-4** and resolder **Shutter FPC** connectors prism right. Retest.
• **IC-4** or **IC-3** may be is defective. Replace **Main FPC** .

D. External Observations

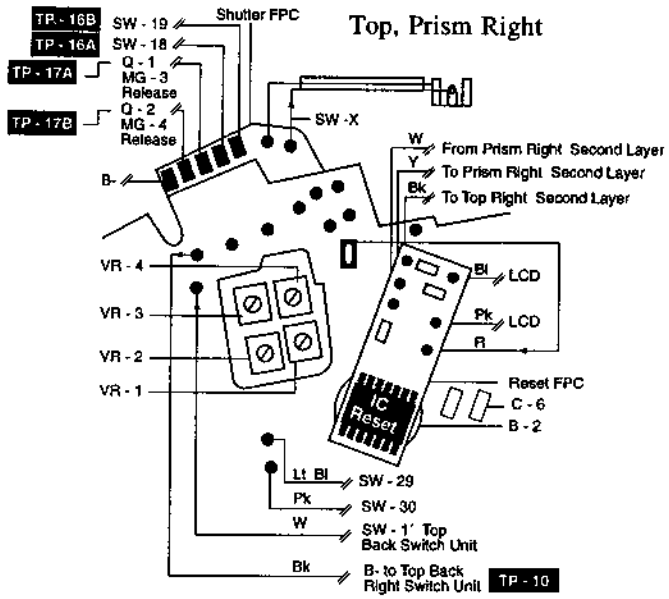
LCD displays 'EEE, finder 'Help ' after mirror cycles.
Shutter operates for one cycle before EEE'.
Power, control dial, lightmeter, release normal.

Unsolder Or **VPP** wire at **DC/DC** . Remove **B+** from battery wire and connect to Or **VPP** wire.
Release 1st Curtain by appling **B+** through **1KΩ** to **TP-17A** :
• Check for near infinite Ω between **TP-16A** and **B-** .
Release 2nd Curtain by appling **B+** through **1KΩ** to **TP-17B** :
• Check for near infinite Ω between **TP-16B** and **B-** .

No → • Repair **SW-18** . • Repair **SW-19** .

Yes

• **IC-3** may be defective. Replace **IC-3** or **Main FPC** .



6. Aperture Malfunctions

Note : Do External Tests #1, 2, 3, 4, 5, 6 to define Aperture Malfunctions.

A. External Observations

Stop down lever doesn't move or auto aperture lever doesn't have free travel when depth of field preview slide is used
Manual and auto aperture incorrect.
Lens functions correctly.
Power, control dial, lightmeter, release, shutter normal.

Remove Mirror Box:
• Check stop down lever, springs, gears, **MG-1** keeper, control levers.

B. External Observations

LCD does not display ■ when lens is off or with lens in manual.
Power, control dial, lightmeter, release, shutter normal.

Remove Covers, Left LCD. Ground pin 24, **IC-3** throug 0Ω.
• Check for LCD■ to turn off.

No → • Resolder pin 24, **IC-3** . Retest.
• **IC-3** may be defective. Replace **IC-3** or **Main FPC** .

Yes

• Resolder pin 24, **IC-3** . Retest.
• Check, clean, align Front Left Connector.
• Check **SW-17** . Repair if defective.
• Use schematic to check **SW-17** path. Repair path if defective.

C. External Observations

Manual aperture always stays open or erratic. Lens good.
Stop down lever and auto aperture lever move correctly and have free travel when depth of field preview slide is used.
Power, control dial, lightmeter, release, shutter normal.

Remove Covers

Ground **TP-22A** though 0Ω while release camera, lens in manual
• Check for normal manual apertures.
— Yes — • **IC-4** may be defective. Replace **Main FPC.**

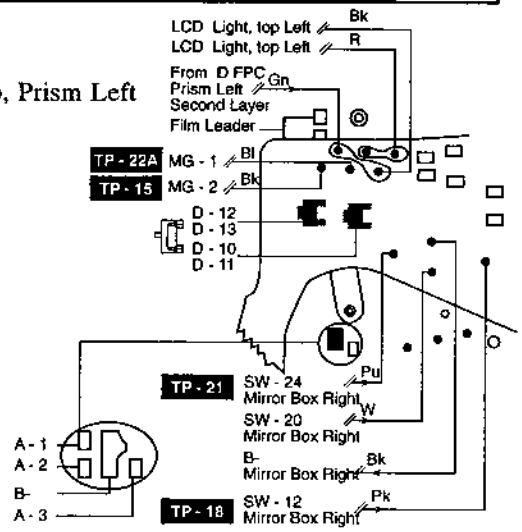
No

• Check for near **B+** at **TP-22B.** — No — • Check for typical 327Ω between **TP-22A** and **TP-22B.** Check **MG-1** wires, soldering if defective.
• Check path between **TP-22B** and **V-Bat.** Repair if defective.

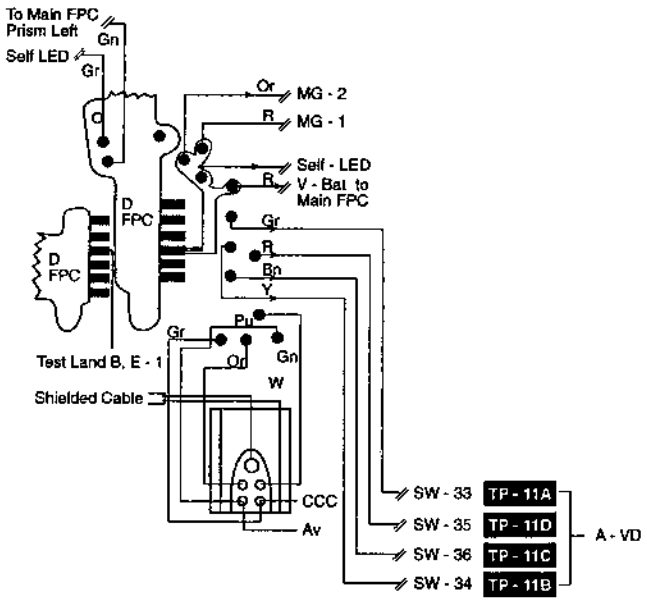
Yes

• Check, clean, repair **MG-1,** keeper, wires spring.

Top, Prism Left



Top, Prism Left, Second Layer



D. External Observations

LCD display ▮ does not turn off when lens is set to 'A'.
Auto aperture incorrect.
Power, control dial, lightmeter, release, shutter normal.

• Check lens auto pin to extend in 'A'. Repair lens if defective.
Remove Covers:
• Check **SW-17** for short. Repair if defective.
• **IC-3** may be defective. Replace **IC-3** or **Main FPC.**

E. External Observations

No Release when lens is switched to 'A'. LCD displays ' **EEE**'.
Release normal without lens and with lens in manual diaphragm.
Power, control dial, lightmeter normal.

Remove Covers, Battery Chamber

Set lens to manual. Reset camera by grounding reset switch **SW-3** solder point. Ground **TP-18** while setting lens to 'A'.
• Check for normal operation.
— Yes — • Check **SW-12** , soldering, wires, control levers. Repair if defective.

No

• Resolder pin 5,**IC-3** . Retest.
• Use schematic to check path between **TP-18** and pin 5, **IC-3**. Repair if defective.
• **IC-3** may be defective. Replace **IC-3** or **Main FPC.**

E. External Observations

Auto aperture always closes completetly or erratic.
Lightmeter correct.
Manual aperture correct.
Power, control dial, release, shutter normal.

Erratic — Yes → • Resolder Pu wire at **TP-21** and pin 45, **IC-3**. Retest.
Remove Covers, Mirror Box:
• Check, clean, repair **SW-24**, **MG-1**, keeper, wires spring.

No
Remove Covers

Unsolder Bl wire at **TP-22A**, release camera, lens set to 'A', lightmeter selecting small aperture:
• Check for auto aperture to be wide open.
— No → • Check, clean, repair **MG-1**, keeper, wires spring.

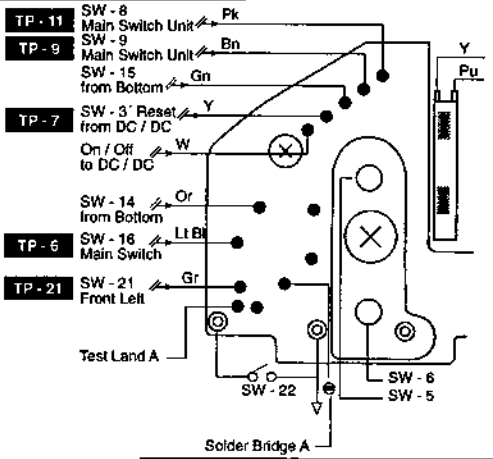
Yes

• Check for pulses at **TP-21**, scope set to 1volt / 0.5ms.
— No or Noisy → • Check, clean **SW-24** wires, soldering.
• Use schematic to check **SW-24** paths.
Repair if defective.

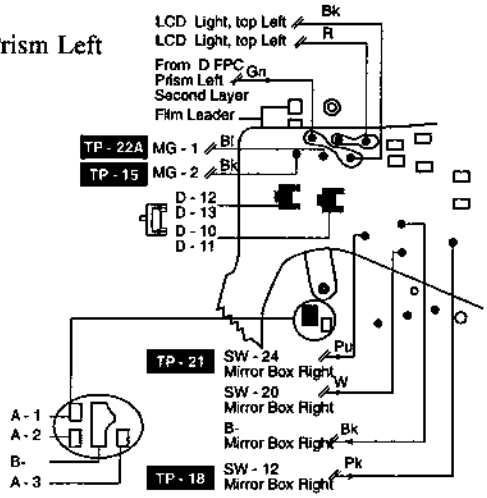
Yes

• Resolder pin 45, **IC-3**. Retest.
• **IC-3** may be defective. Replace **IC-3** or **Main FPC**.

Top Left



Top, Prism Left



7. Film Transport Malfunctions

Note : Do External Tests #1, 4, 7 to define Transport Malfunctions.

A. External Observations

LCD does not display cassette icon when frame number sensing pad is depressed.
Power, release normal.

Remove Covers

Unsolder Gr **SW-21** wire at **TP-23**:
• Check LCD for cassette icon.
— Yes → Unsolder Gr **SW-21** wire at **TP-23**:
• Check **SW-21** for short. Repair if defective.

No

• **IC-3** may be defective. Replace **IC-3** or **Main FPC**.

B. External Observations

Film transport motor runs when film door is closed without film.
Power, release normal.

• Check LCD for cassette icon. — Yes →
Remove Covers. Ground **TP-23** through 0Ω:
• Check LCD cassette icon to turn off.
If icon turns off:
• Check **SW-21** for open. Repair if defective.
If icon doesn't turn off:
• Resolder pin 28, **IC-3**. Retest.
• Use schematic to check path between **TP-23** and pin 38, **IC-3**. Repair if defective.
• **IC-3** may be defective. Replace **IC-3** or **Main FPC**.

No

• **IC-3** may be defective. Replace **IC-3** or **Main FPC**.

C. External Observations

Film does not transport when film door is closed with film in camera.
LCD displays cassette icon when frame number sensing pad is depressed.
Power, release normal.

Close film door with film inserted:
• Check LCD for cassette icon.
— No → • Check cassette light seal for proper pressure. Repair or replace if defective.

Yes

Close film door with film inserted:
• Check for high current draw or motor sound.
— Yes → • Check for free rewind fork. Check rewind gears, **PNP Q-12 , NPN Q-13** if defective.
• Check wind gears. Repair or replace if defective.
• Check **M-1** for short. Replace if defective.

No

Remove Covers

Desolder film door switch **SW-22**, press frame number sensing pad, make sure cassette icon is displayed:
• Check for transport motor to run.
— Yes → • Check switch **SW-22** for short, switch control. Repair or replace if defective.

No

• Resolder **M-1** wires. Retest.
Apply battery power directly to **M-1** .
Reverse leads between tests.:
• Check for motor to turn in both directions.
— No → • Check wind gears. Repair or replace if defective.
• Check **M-1** . Replace if defective.

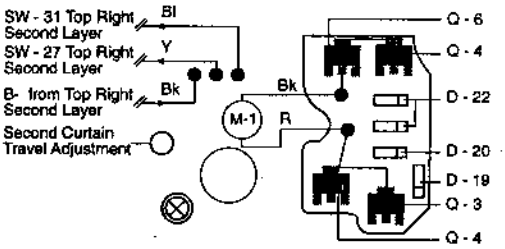
Yes

Apply **B-** through 1KΩ probe to base **Q-3** and **B+** through 1KΩ probe to base **Q-6**:
• Check for **M-1** to run.
— No → • Resolder **Q-3 , Q-6** . Retest.
• Use schematic to check **Q-3 , Q-6** paths. Repair if defective.
• Test **PNP Q-3** . Replace if defective.
• Test **NPN Q-6** . Replace if defective.

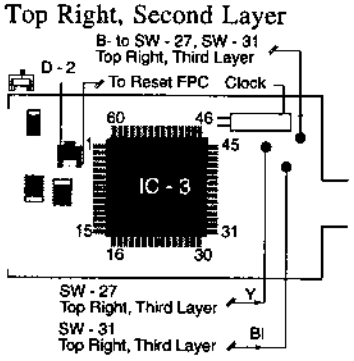
Yes

• **IC-10 , IC-5** or **IC-3** may be defective. Replace **IC-10** or **MD FPC** and retest.

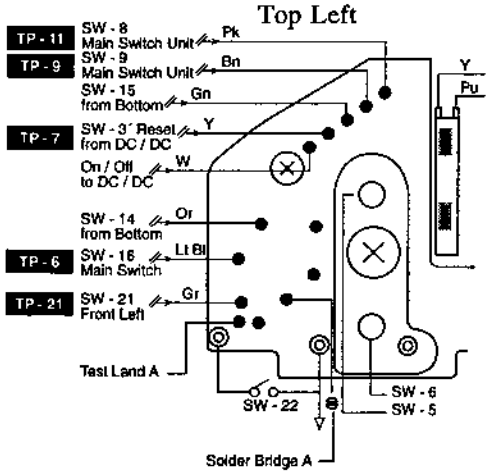
Top Right, Third Layer



Top Right, Second Layer



Top Left



D. External Observations

Film does not advance correctly to 1st frame or film spacing problems or film runs through without stopping.
Power, release normal.

With film door open trip door latch and press frame number sensing pad:
• Check for sprocket to turn directly then free wheel at end of advance.
— No → • Check wind gears, sprocket. Repair or replace if defective.

Yes

Redo test:
• Check for spool to run backwards at end of advance.
— No → Apply **B-** through 1KΩ probe to base **Q4** and **B+** through 1KΩ probe to base **Q-5**:
• Check for **M-1** to run backwards.
If motor doesn't run backwards:
• Resolder **Q-4, Q-5**. Retest.
• Use schematic to check **Q-4, Q-5** paths. Repair if defective.
• Test **PNP Q-4**. Replace if defective.
• Test **NPN Q-5**. Replace if defective.
If motor run backwards:
• **IC-10** may be defective. Replace **IC-10** or **MD FPC** .

Yes

Continued

Continued

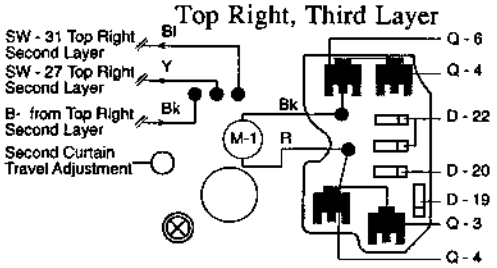
- Check LCD to display moving film bar icons as sprocket turns.
  Note : Improper spacing can be caused by noise on film advance switch **SW-31** even if icons are correct.

No →
- Resolder **SW-27, SW-31** wires. Retest.
- Use schematic to check **SW-27, SW-31** paths. Repair if defective.
- Check **SW-27, SW-31**. Repair if defective.
- **IC-6, IC-5** or **IC-3** may be defective. Replace **Main FPC.**

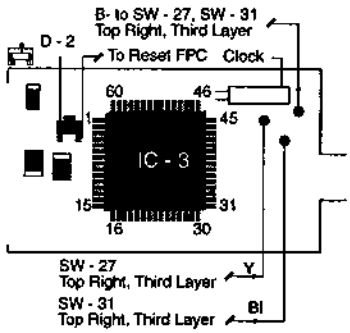
Yes ↓

- Check **SW-27**. Repair if defective.
- Use schematic to check **SW-27** path. Repair if defective.
- **IC-6 , IC-5** or **IC-3** may be defective. Replace **Main FPC.**

Top Right, Third Layer



Top Right, Second Layer



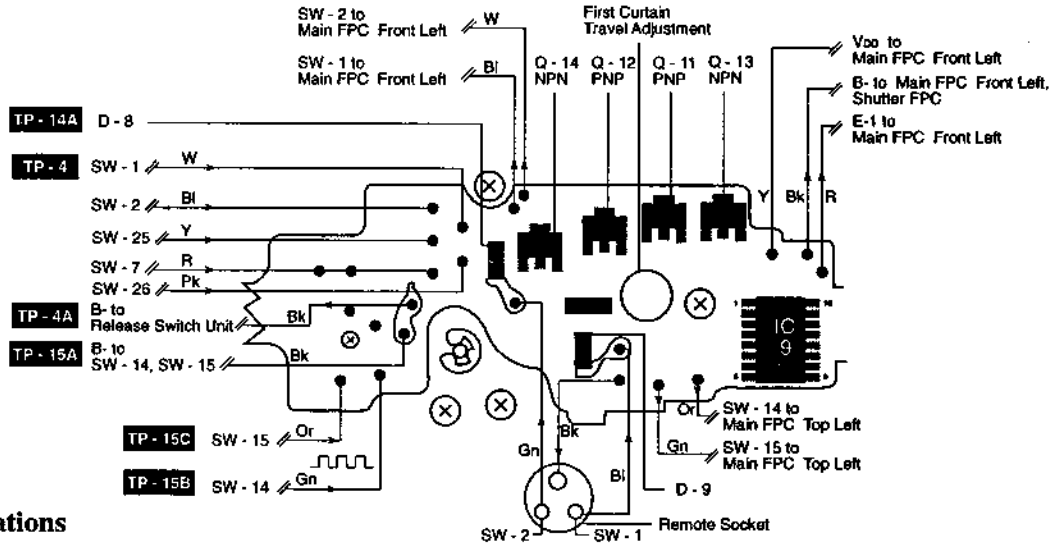
E. External Observations

Finder LCD does not count down last '9' frames.
Power, release normal.

- Check Cassette light seal and pressure plate. — Bad → • Repair or replace light seal or pressure plate.

Good ↓

Remove Front, Top Covers, bottom center switch block, access **D FPC** under **Main FPC** Top Left:
- Use schematic to check **DX** paths for 0Ω. Repair or replace **DX FPC** if defective.
- Resolder **D FPC / DX FPC** Top Left, Prism Left. Retest.
- **IC-8** may be defective. Replace **D FPC.**



F. External Observations

No Auto Rewind.
Film Advance, Frame count normal.
Power, release normal.

- Advance film several frames. Press manual rewind button:
  • Check for motor sound or 2 sec. current increase. — Yes → Check rewind gears, rewind fork.

No ↓

Continued

Continued

No

- Resolder **M-3** wires. Retest.
Apply battery power directly to **M-3**.
Reverse leads between tests.:
- Check for motor to turn in both directions.

No →
- Check rewind gears. Repair or replace if defective.
- Check **M-3**. Replace if defective.

Yes

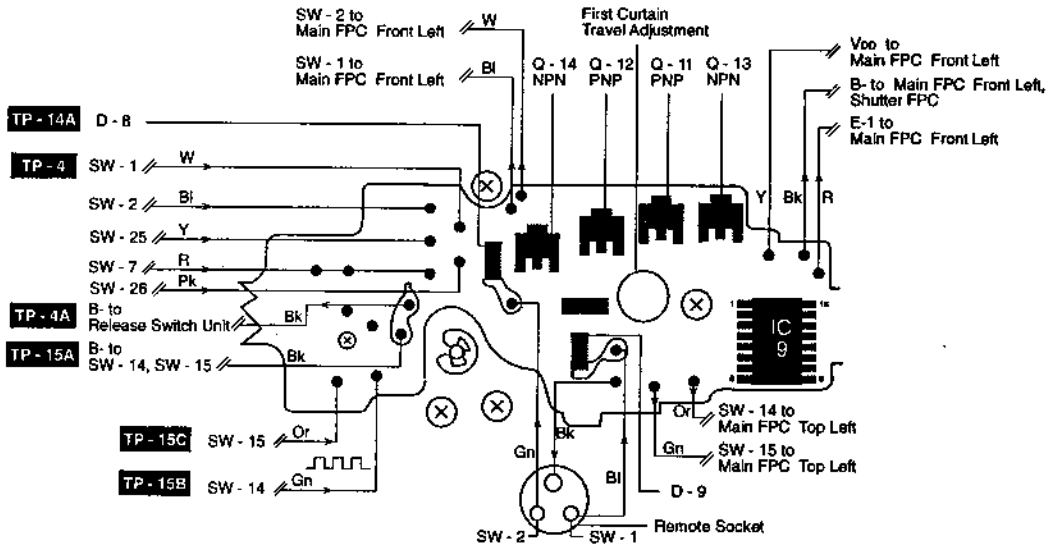
Apply **B-** through 1KΩ probe to base **Q-11** and **B+** through 1KΩ probe to base **Q-14**:
- Check for **M-3** to run.

No →
- Resolder **Q-11, Q-14**. Retest.
- Use schematic to check **Q-11, Q-14** paths. Repair if defective.
- Test **PNP Q-11**. Replace if defective.
- Test **NPN Q-14**. Replace if defective.

Yes

- **IC-9** may be defective. Replace **IC-9** or **MD FPC** and retest.

Bottom Left



8. Flash Malfunctions.

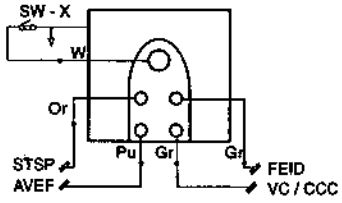
Note : Do External Tests #1, 3, 4, 5, 6, 8 to define Flash Malfunctions.

A. External Observations

Shutter speed does not set to 1/250 when VC / CCC contact is grounded through 3KΩ.
Power, lightmeter, release, shutter, aperture normal.

- Check VC / CCC contact, Gr wire. Clean, repair, resolder if defective.
- **IC-4** may be defective. Replace **IC-4** or **Main FPC**.

Hot Shoe



B. External Observations

Finder doesn't display F/4, lens doesn't select F/4 when VC / CCC is shorted to AVEF while grounding VC / CCC through 3KΩ.
Power, lightmeter, release, shutter, aperture normal.

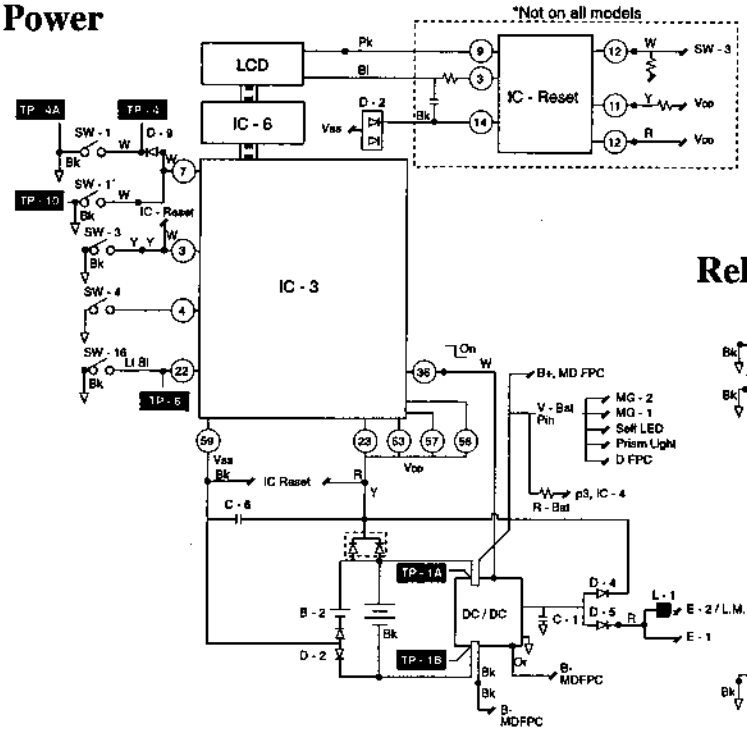
- Check AVEF contact, Pu wire. Clean, repair, resolder if defective.
- **IC-4** may be defective. Replace **IC-4** or **Main FPC**.

C. External Observations

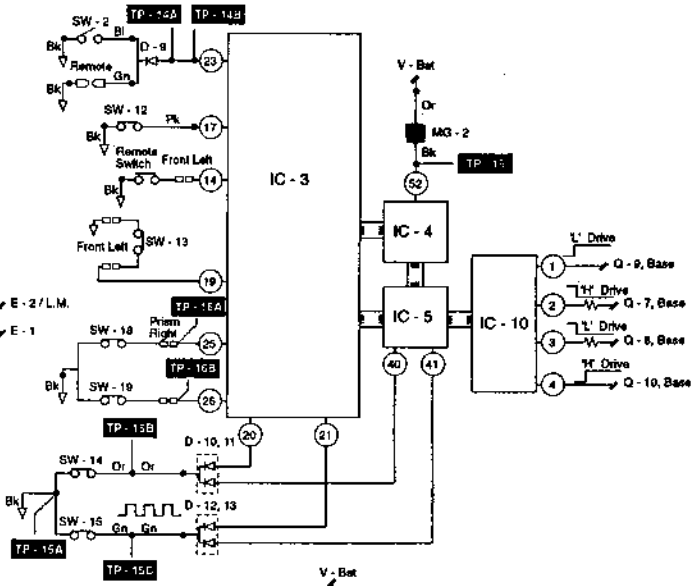
Resistance between X contact and ground low with shutter closed or high with shutter open on 'B'
Power, lightmeter, release, shutter, aperture normal.

- Check **SW-X** wires, soldering between hot shoe and prism right. Repair if defective.
- Check **SW-X**, path. Repair if defective.

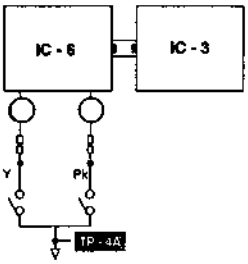
Power

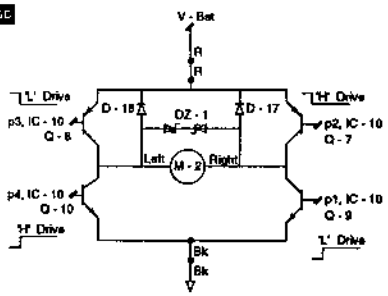


Release

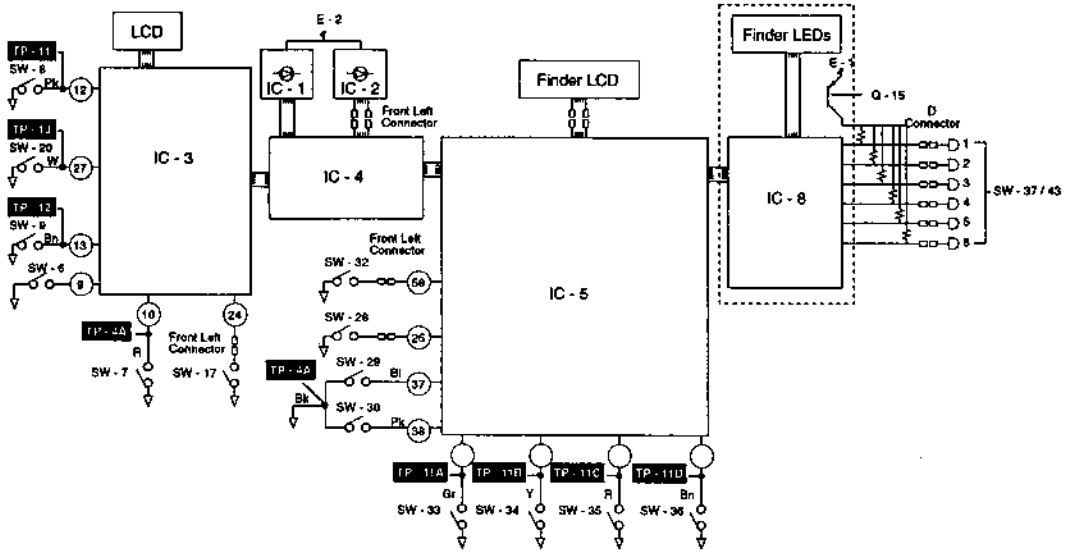


Control Dial

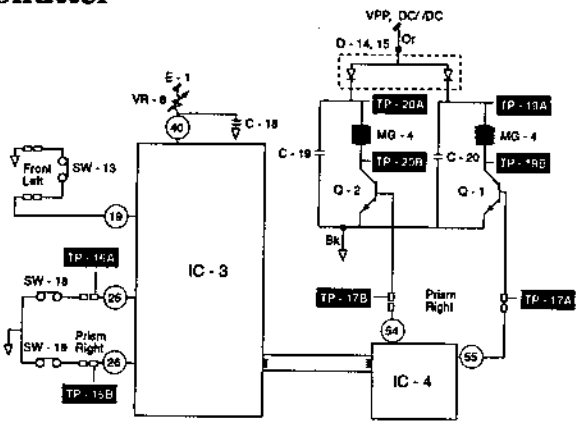




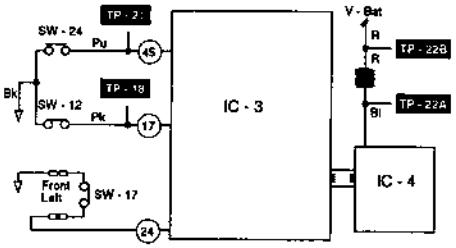
Lightmeter



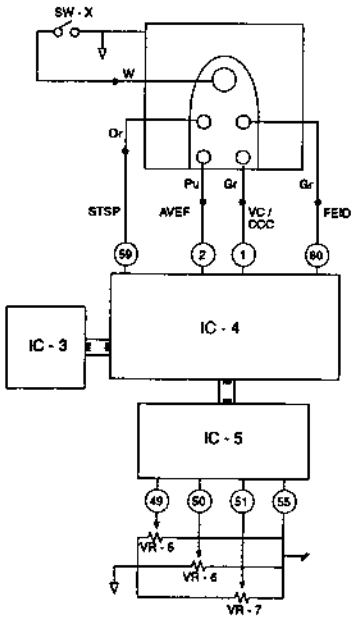
Shutter



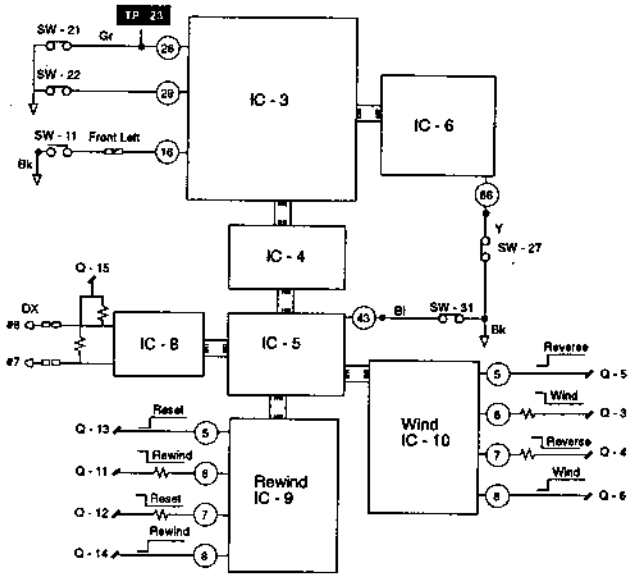
Aperture



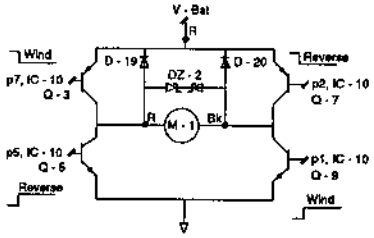
Flash



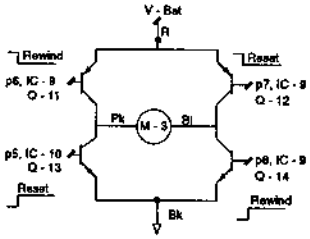
Film Transport



Wind



Rewind

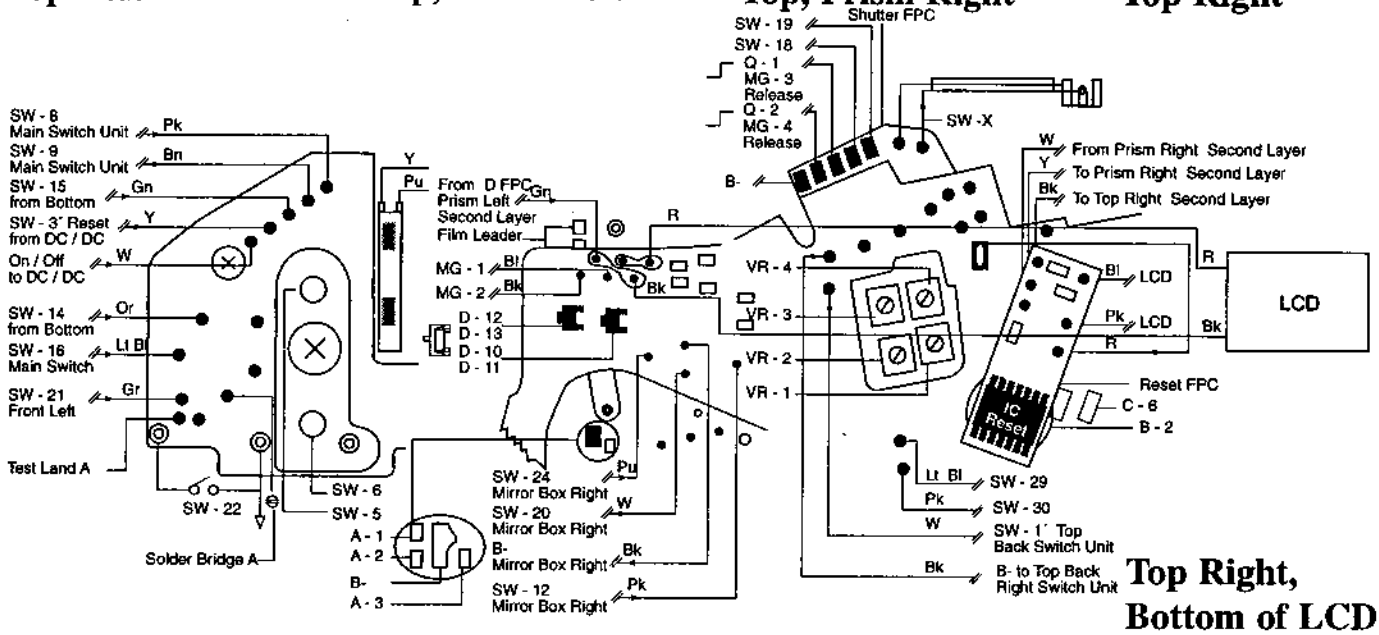


Top Left

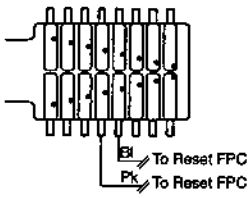
Top, Prism Left

Top, Prism Right

Top Right



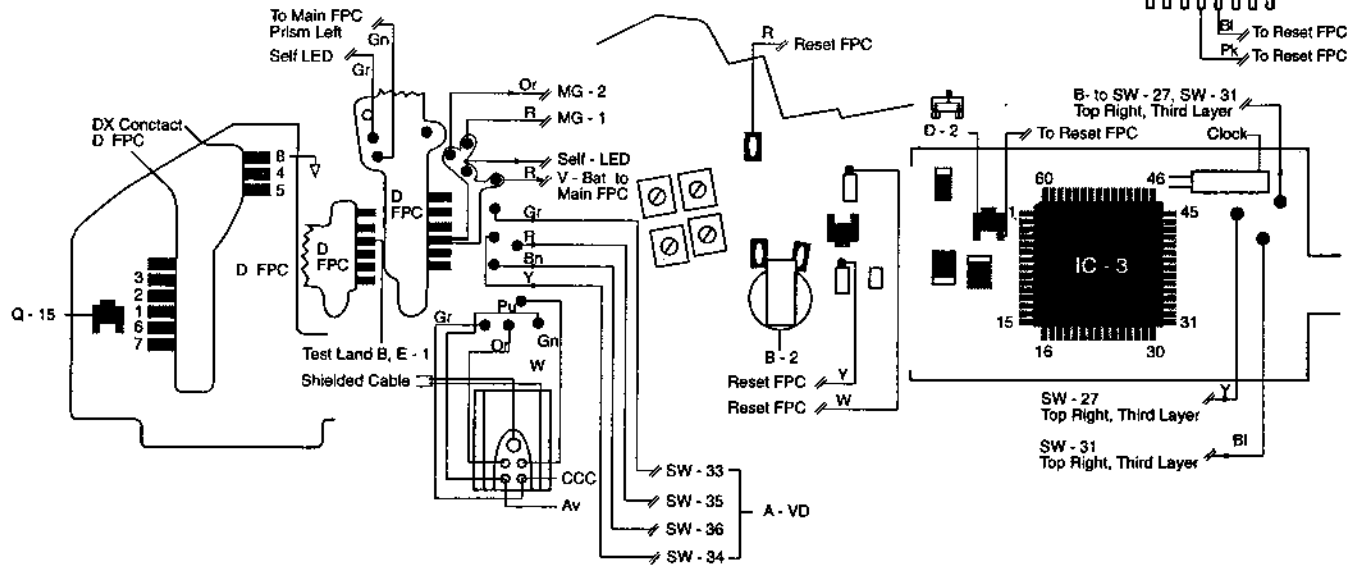
Top Right, Bottom of LCD



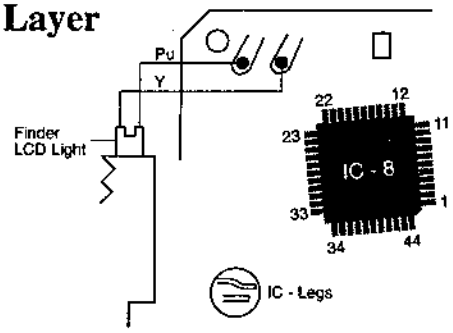
Top Left, Second Layer

Top, Prism Left, Second Layer

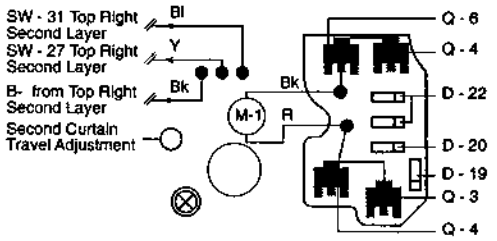
Top, Prism Right, Third Layer



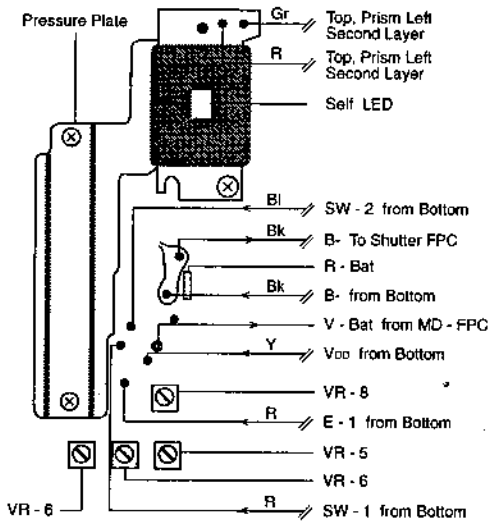
Top Left, Third Layer



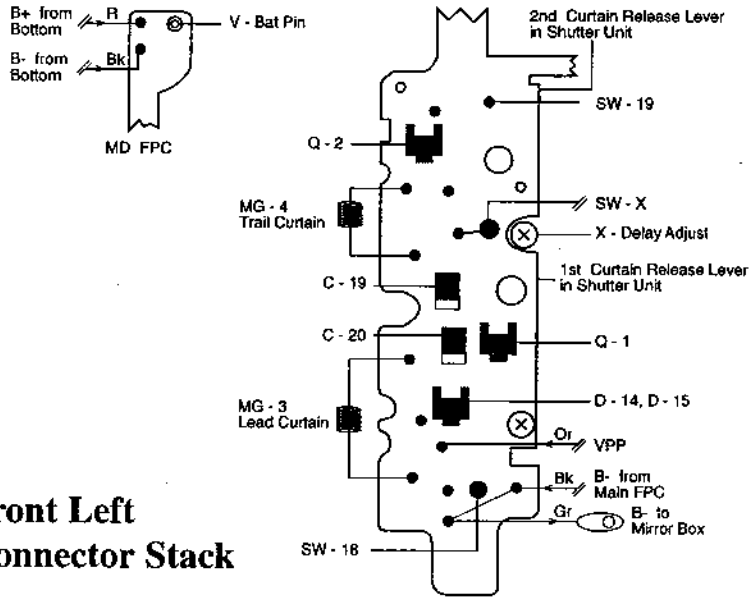
Top Right, Third Layer



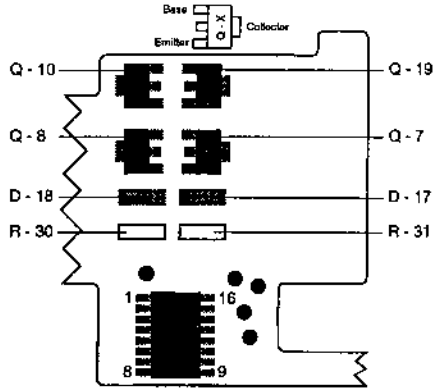
Front Left



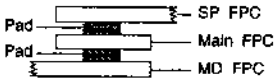
Front Left, Second Layer



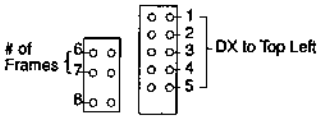
Handgrip, Charge Motor Removed



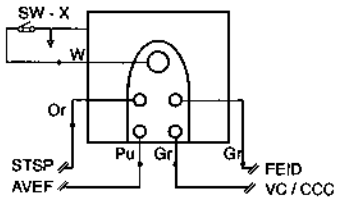
Front Left Connector Stack



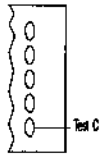
DX Contacts



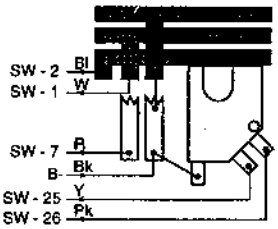
Hot Shoe



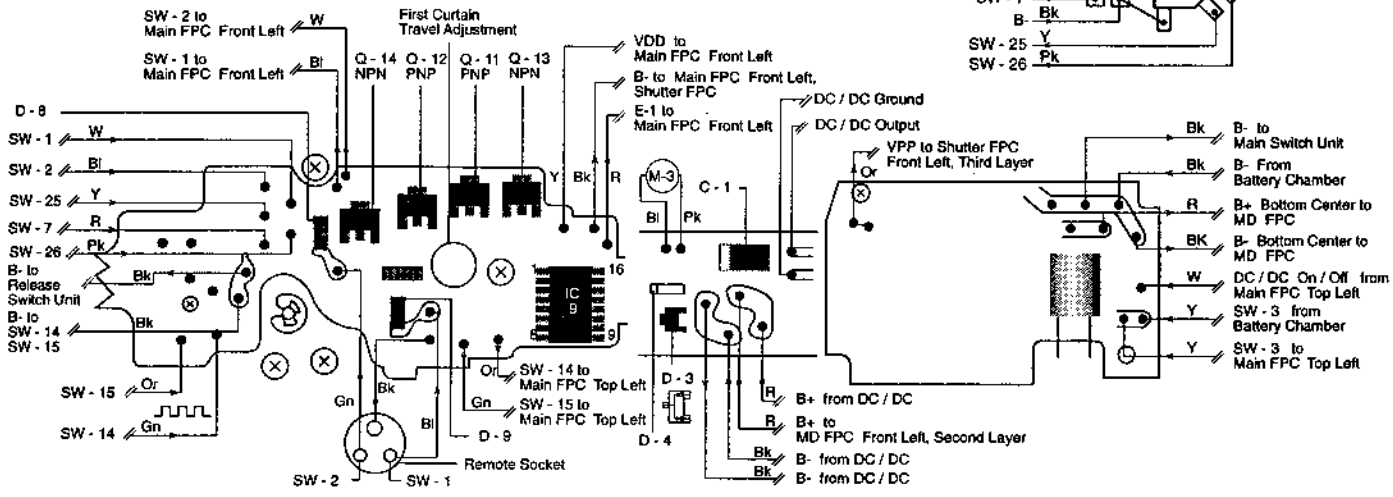
Command Back Contacts



Release Button Unit



Bottom


SW - 2 to Main FPC Front Left
W
SW - 1 to Main FPC Front Left
Bl
First Curtain Travel Adjustment
Q - 14 NPN
Q - 12 PNP
Q - 11 PNP
Q - 13 NPN
VDD to Main FPC Front Left
B- to Main FPC Front Left, Shutter FPC
E-1 to Main FPC Front Left
DC / DC Ground
DC / DC Output
VPP to Shutter FPC Front Left, Third Layer
D - 8
SW - 1
SW - 2
SW - 25
SW - 7
SW - 26
B- to Release Switch Unit
B- to SW - 14
SW - 15
M-3
C - 1
IC 9
SW - 15
SW - 14
SW - 14 to Main FPC Top Left
SW - 15 to Main FPC Top Left
D - 9
Remote Socket
SW - 2
SW - 1
D - 3
D - 4
B+ from DC / DC
B+ to MD FPC Front Left, Second Layer
B- from DC / DC
B- from DC / DC
B- to Main Switch Unit
B- From Battery Chamber
B+ Bottom Center to MD FPC
B- Bottom Center to MD FPC
DC / DC On / Off from Main FPC Top Left
SW - 3 from Battery Chamber
SW - 3 to Main FPC Top Left

VII. PARTS LIST

Name	Part Number
Top Cover Unit	CG1-0851-000
Screen E, focusing	CG1-0860-000
Screw, top front	XA1-7170-307
Screw, top right	X99-0561-000
Screw, top back	X91-1737-880
Lever, eyepiece	CA1-6382-000
Cap, eyepiece lever	CA1-6383-000
Screw, eyepiece lever	X91-1436-910
Switch, H.S. Control	CA1-6506-000
Shoe, flash	CA1-6504-000
Screw, flash shoe	XA1-3170-509
Spring plate, flash	CA1-3385-000
Base, flash shoe	CA1-6505-000
Base, flash shoe under top	CA1-6506-000
Screw, film door latch	X99-0561-000
Cover, flim door latch	CA1-6362-000
Button, film door latch	CA1-6365-000
Spring, film door button	CS1-5690-000
Knob, film door	CA1-6443-000
Lock, film door	CA1-6363-000
Spring, film door lock	CS1-5780-000
Front Cover, apron	CG9-2684-000
Screw, front apron	X91-1737-980
Sheet, rubber bottom	CA1-6305-000
Battery Pack Unit	CG9-2683-000
Cap, remote	CA4-1847-000
Screw, bottom	X91-1737-930
Screw, bottom	X91-1737-900
Screw, bottom	XA1-7170-257
Spring, handgrip bottom	CS1-5893-000
Spring, handgrip top	CS1-5894-000
Screw, film door hinge	XA-8200-707
Film door hinge	CA1-6414-000
Rubber, handgrip	CA1-6340-000
Film Door	CG1-0852-000
Sponge, cassette	CA1-6527-000
Pressure Plate	CF1-0423-000
Latch, on film door	CA1-6522-000

Name	Part Number
Release Button Unit	CG9-2677-000
Release Button	CA1-6349-000
Brush, control dial	CA1-6345-000
Tripod socket	CA1-6369-000
LCD, external	AF7-5002-000
Eyepiece	CG9-2680-000
Eyepiece, shutter unit	CG9-2681-000
Reset FPC	CG9-2691-000
LCD, lamp	WG1-0275-000
Backup Battery	WK1-9022-000
Main FPC	CY1-1252-000
Main Switch Unit	CG9-2678-000
Rewind Motor	WL1-9061-000
Rewind Gear Unit	CY1-1232-000
MD FPC	CG1-~~087~~-000 0857
Finder FPC	CY1-1253-000
LED, finder lamp	CH4-0152-000
SP FPC	CY1-1234-000
AE Unit, with MG-1	CG1-0869-000
Mirror, reflex	CN1-5303-000
Mirror Unit	CG9-2689-000
Sprocket	CA1-4174-000
Charge Motor	WL1-9060-000
Gear, charge	CS1-0826-000
Gear, charge	CS1-0825-000
Gear, charge	CS1-0829-000
Film Wind Motor	WL1-9059-000
Shutter Unit, with FPC	CG1-0871-000
Shutter FPC	CY1-1250-000
Shutter Magnet Unit	CY1-1251-000
Shutter Curtain, 1st	CF1-1721-000
Shutter Curtain, 2nd	CS1-6733-000
DC / DC	CH3-0021-000
IC-1	CH4-0161-000
IC-3	CH4-0153-000
IC-9	CH4-0159-000
IC-10, same as IC-9	CH4-0159-000

Preparation and Editorial Director, Chuck Bertone. Artwork and layout , Michael Johnson

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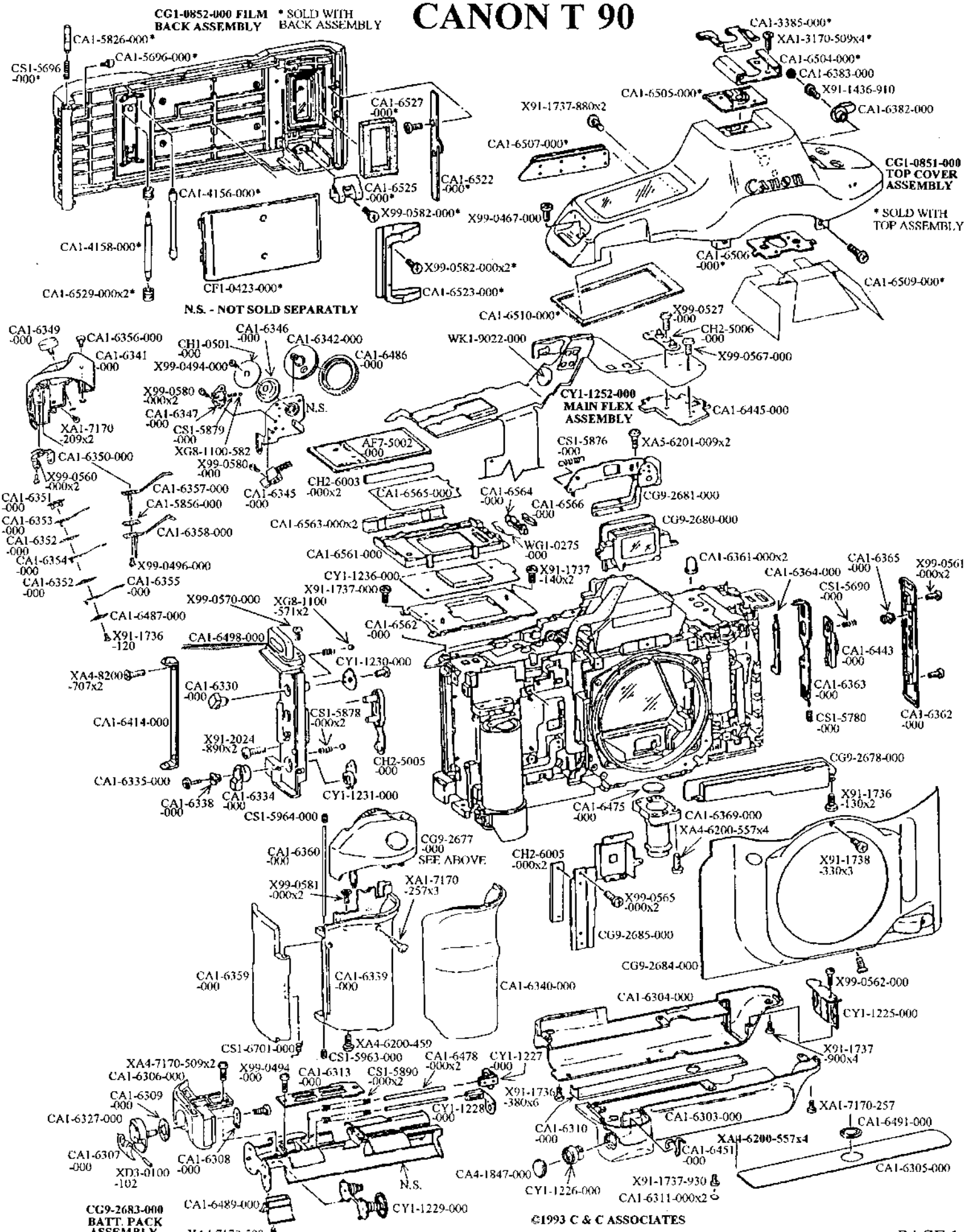
CANON T 90



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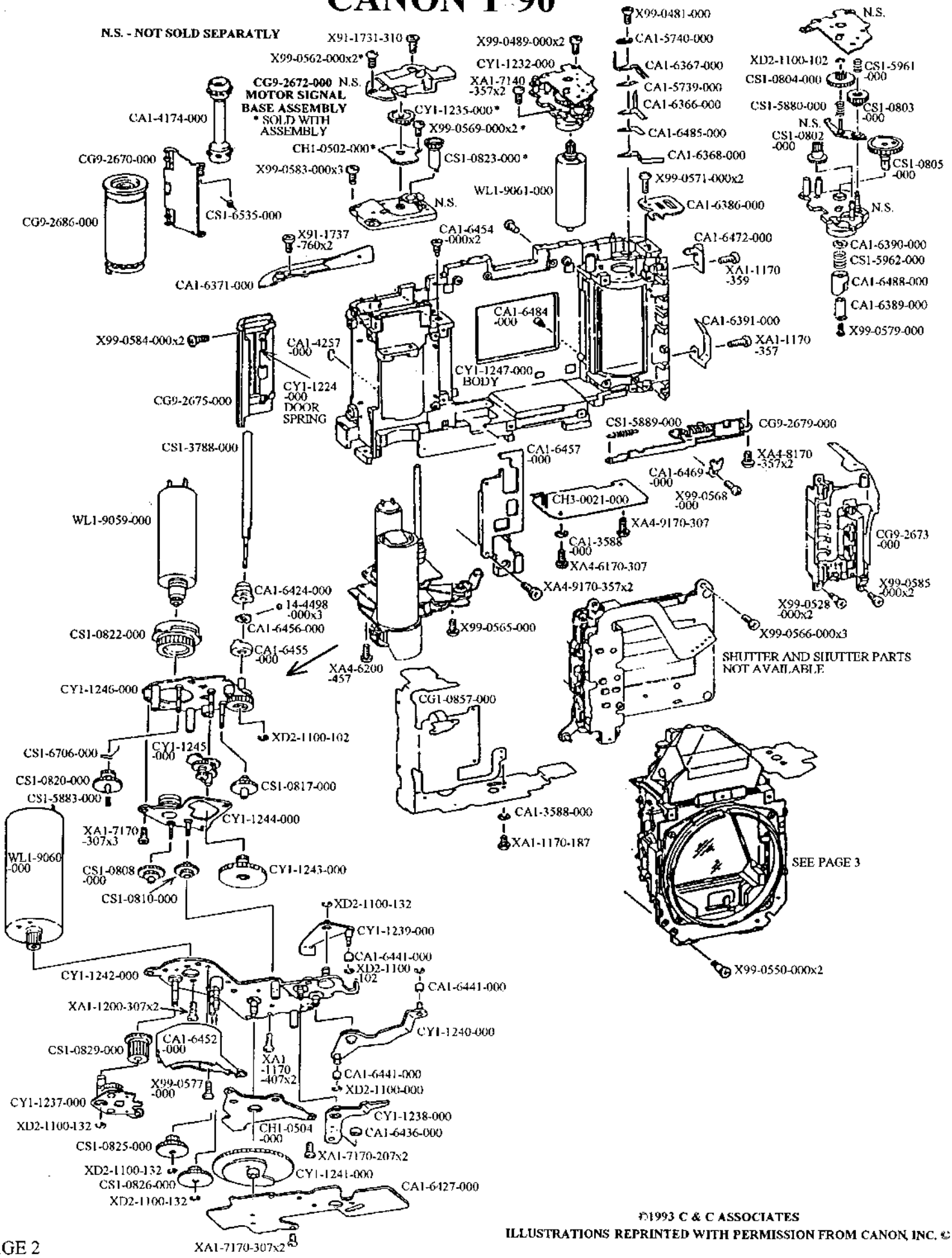
CANON T 90



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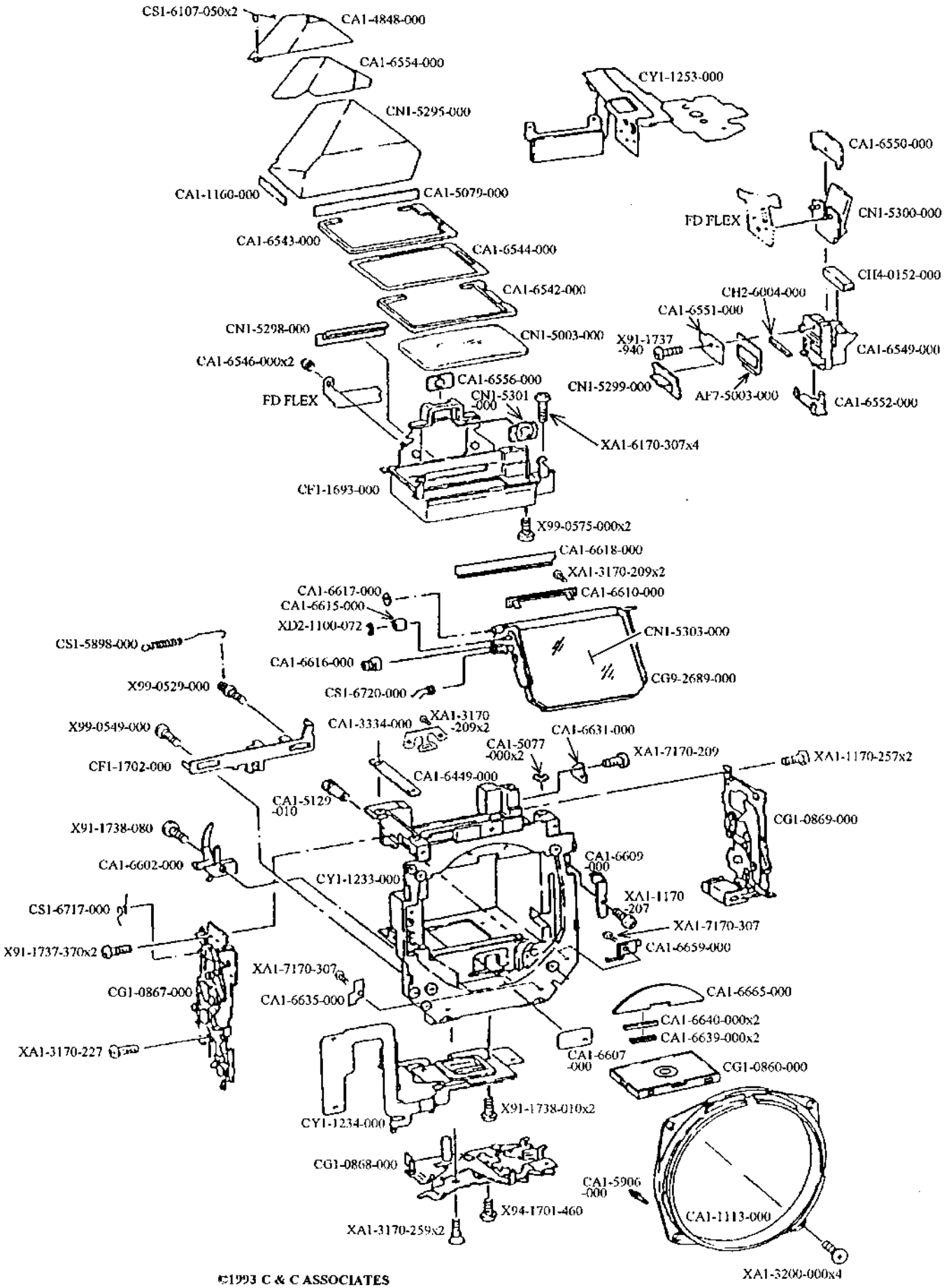

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